Duplicate ~~15.~~

15

TRANSACTIONS

OF THE

AMERICAN

OPHTHALMOLOGICAL SOCIETY.

EIGHTH ANNUAL MEETING.

Newport, July, 1871.

NEW YORK:
D. APPLETON AND COMPANY,
549 & 551 BROADWAY.
1871.

DIAGNOSIS.

187

M.

Refraction. R. v. = Both. =

L. v. =

Accom. = Relative A. at in. = + —

Adduction	at	in. =	°	: with vert. diplopia	at	in. =	°	Muscles.
" with	at	in. =	°	: with v. d. and	at	in. =	°	
Abduction	at	in. =	°	: with vert. diplopia	at	ft. =	°	
" with	at	in. =	°	: with v. d. and	at	ft. =	°	
Linear deviation	at	in. =		lines :	at	ft. =		

Ophthalmoscope.

History and Treatment.

INDEX.

PAGE
Members of the Society 5
Minutes of Eighth Annual Meeting 7
Report on the Progress of Ophthalmology. By B. JOY JEFFRIES, M. D., Boston 13
An Apparatus for cutting Microscopic Sections of Eyes. By EDWARD CURTIS, M. D., New York 60
General Syphilitic Inflammation of the Eye. By FRANCIS DELAFIELD, M. D., New York 69
Halo round Macula. By EDWARD G. LORING, M. D., New York 73
A Scheme to aid in recording and examining Cases of Asthenopia. By HENRY D. NOYES, M. D., New York 81
On the Tables given by Loring and Knapp to show the Displacement of the Retina in Ametropia. By O. F. WADSWORTH, M. D., Boston. 87
Variety of Forms of Small Pencils of Astigmatic Rays. By GUSTAVUS HAY, M. D., Boston 90
The Retina an Asymmetrical Surface. By RUSSELL MURDOCH, M. D., Baltimore 93
An Additional Method for the Determination of Astigmatism. By GEORGE STRAWBRIDGE, M. D., Philadelphia 100
On Astigmatism as an Active Cause of Myopia. By J. GREEN, M. D., St. Louis 105
An Astigmatic Glass for Cataract Patients, with some Remarks on the Statistics of Vision in Cataract Operations. By EDWARD G. LORING, M. D., New York 108
An Apparatus for testing the Perception of Color. By HENRY D. NOYES, M. D., New York 118
Modification of Jaeger's Ophthalmoscope. By G. STRAWBRIDGE, M. D., Philadelphia 120
Gunshot-wound of the Brain, followed by Fungus Cerebri: Hemiopsia. By WILLIAM F. THOMSON, M. D., Philadelphia 122

PAGE

Detachment of Retina with Laceration at Macula. By HENRY D. NOYES, M. D., New York 128

Report of Passavant Operations with and without Ether, and also under Nitrous Oxide. By B. JOY JEFFRIES, Boston 130

Readjustment of Levator Muscle of Upper Lid. By J. GREEN, M. D., St. Louis 134

Additional Note upon the Use of Atropine in the Treatment of Incipient Strabismus. By J. GREEN, M. D., St. Louis 136

Paralysis of Trigeminus followed by Sloughing of Cornea. By WILLIAM F. NORRIS, M. D., Philadelphia 138

A Case of Congenital Fissure of the Lids. By W. W. SEELY, M. D., Cincinnati 142

Congenital Absence of both Eyeballs. By G. STRAWBRIDGE, M. D., Philadelphia 144

MEMBERS

OF THE

American Ophthalmological Society.

ACTIVE MEMBERS.

Dr. C. R. Agnew	New York,	New York.
Dr. C. M. Allin	"	"
Dr. H. Althof	"	"
Dr. Joseph Aub	Cincinnati,	Ohio.
Dr. Charles S. Bull	New York,	New York.
Dr. F. J. Bumstead	"	"
Dr. William H. Carmalt	"	"
Dr. Edward Curtis	"	"
Dr. Edward M. Curtis	Sacramento,	California.
Dr. Edward Delafield	New York,	New York.
Dr. Francis Delafield	"	"
Dr. Hasket Derby	Boston,	Massachusetts.
Dr. R. H. Derby	New York,	New York.
Dr. John H. Dix	Boston,	Massachusetts.
Dr. A. Du Bois	New York,	New York.
Dr. E. Dyer	Philadelphia,	Pennsylvania.
Dr. Henry C. Eno	New York,	New York.
Dr. John Green	St. Louis,	Missouri.
Dr. A. D. Hall	Philadelphia,	Pennsylvania.
Dr. Gustavus Hay	Boston,	Massachusetts.
Dr. John H. Hinton	New York,	New York.
Dr. Edward L. Holmes	Chicago,	Illinois.
Dr. Edwin Hutchinson	Utica,	New York.
Dr. B. Joy Jeffries	Boston,	Massachusetts.
Dr. Samuel J. Jones	Chicago,	Illinois.
Dr. H. Knapp	New York,	New York.
Dr. Edward G. Loring	"	"
Dr. Arthur Matthewson	Brooklyn,	"
Dr. H. G. Miller	Providence,	Rhode Island.

Dr. T. G. Morton	Philadelphia,	Pennsylvania.
Dr. Russell Murdoch	Baltimore,	Maryland.
Dr. Homer G. Newton	Brooklyn,	New York.
Dr. William F. Norris	Philadelphia,	Pennsylvania.
Dr. Henry D. Noyes	New York,	New York.
Dr. J. F. Noyes	Detroit,	Michigan.
Dr. O. D. Pomeroy	New York,	New York.
Dr. Thomas R. Pooley	"	"
Dr. J. S. Prout	Brooklyn,	"
Dr. Charles E. Rider	Rochester,	"
Dr. C. A. Robertson	Albany,	"
Dr. D. B. St. John Roosa	New York,	"
Dr. W. W. Seely	Cincinnati,	Ohio.
Dr. Henry L. Shaw	Boston,	Massachusetts.
Dr. Francis Simrock	New York,	New York.
Dr. Francis P. Sprague	Boston,	Massachusetts.
Dr. George Strawbridge	Philadelphia,	Pennsylvania.
Dr. William F. Thomson	"	"
Dr. O. F. Wadsworth	Boston,	Massachusetts.
Dr. Robert Willard	"	"
Dr. A. D. Williams	Cincinnati,	Ohio.
Dr. E. Williams	"	"
Dr. Henry W. Williams	Boston,	Massachusetts.

Total.. 51

HONORARY MEMBERS.

Dr. G. A. Bethune	Boston,	Massachusetts.
Dr. Isaac Hays	Philadelphia,	Pennsylvania.
Dr. R. Hooper	Boston,	Massachusetts.
Dr. John Jeffries	"	"
Dr. E. Reynolds	"	"
Dr. C. Schweigger	Berlin,	Prussia.
Dr. George Wilkes	New York,	New York.

Total.. 7

Whole Number............................ 58

AMERICAN
Ophthalmological Society.

Newport, *July* 20, 1871.

The Society met at the Ocean House, at 10 A. M., and was called to order by the President, Dr. H. W. Williams.—Present:

Dr. C. R. Agnew	New York.
“ F. Delafield	“
“ O. D. Pomeroy	“
“ E. G. Loring	“
“ Edward Curtis	“
“ Wm. F. Norris	“
“ H. D. Noyes	Philadelphia.
“ Wm. Thomson	“
“ E. Dyer	“
“ G. Hay	Boston.
“ B. J. Jeffries	“
“ O. F. Wadsworth	“
“ H. G. Newton	Brooklyn.
“ John Green	St. Louis.

Minutes of the session of the last day of the last meeting read and approved. The President appointed a Business Committee to prepare a bulletin, and to select the topic of discussion for next meeting, consisting of Drs. Agnew and Thomson.

He also appointed a Nominating Committee, consisting of Drs. Loring, Wadsworth, Norris, Green, and Pomeroy. The Secretary presented the resignation of Dr. Robert Watts, of New York, which was accepted. The Nominating Committee reported for election as active members:

Dr. George Strawbridge . .	Philadelphia.
" Charles S. Bull . . .	New York.
" Edwin Hutchinson . .	Utica.
" Richard H. Derby . .	New York.

All of whom were elected.

The Business Committee then reported the bulletin, which was taken up for consideration:

1. Remarks on cataract, by Dr. Loring. A pair of cataract-glasses was shown, in which a cylindric and a spherical surface were united by a novel method.

2. A case of congenital fissure of the lids, by Dr. Seely, of Cincinnati.

3. A case of congenital absence of both eyeballs, by Dr. George Strawbridge, of Philadelphia.

In reference to the question of how much effect in the production of congenital deformities is to be ascribed to impressions made on the mind of the mother during pregnancy, Dr. Agnew reported a case of a child born with staphyloma of the cornea, whose mother during pregnancy had been greatly disturbed by seeing, in Dr. Agnew's office, a patient having staphyloma of the cornea. Dr. Norris reported a case of congenital absence of the prepuce in a child whose mother during pregnancy had witnessed the operation of circumcision.

4. Sloughing of the cornea following paralysis of the trigeminal nerve, by Dr. Norris, of Philadelphia. Dr. Noyes related several cases which he had observed, and alluded to a report which he had recently made of some of them in the *New York Medical Journal.*

5. Dr. Jeffries read by title the report on ophthalmology, and reported also cases of herpes zoster ophthalmicus.

6. Two cases of general syphilitic inflammation of the eye, by Dr. F. Delafield, of New York, with morbid specimens.

7. Report of Passavant's operations, with and without ether, and also under nitrous-oxide gas, by Dr. Jeffries. Dr. Noyes related cases of the operation, in most instances with

success—in a few cases with relapses. Dr. Noyes was in the habit of using nitrous-oxide gas for minor operations on and about the eye.

8. An additional method for testing cases of astigmatism, by Dr. Strawbridge, of Philadelphia.

Dr. Green remarked upon the delicacy and value of the diagram described, but denied that it was new. He had used and exhibited similar figures, to be viewed, like this one, by transmitted light, and had made other diagrams on the same principle, some of which other members of the Society had also employed.

9. Variety of forms of astigmatic pencils, by Dr. Hay.

10. Ophthalmoscopic signs in asthenopia, by Dr. Loring, with drawings of alterations in the fundus oculi.

11. An apparatus for cutting microscopic sections of eyes, by Dr. Edward Curtis, of New York, with many specimens mounted for study under the microscope, which were examined by the Society. The papers were referred to the Publishing Committee.

On motion, adjourned.

EVENING SESSION, AT HALF-PAST SEVEN O'CLOCK.

President in the chair. Minutes of the previous meeting read and approved.

The Treasurer read his report, which was referred to an Auditing Committee, consisting of Drs. Dyer and Jeffries.

The bulletin was then resumed.

12. A case of readjustment of the levator palpebræ superioris, by Dr. Green.

13. Astigmatism from old corneal disease, treated by cylindrical glasses. Dr. Green.

14. Astigmatism as a cause of myopia. Dr. Green.

15. Experiences with the use of atropia in the treatment of strabismus. Dr. Green.

16. Remarks on Sämisch's method of treating ulcus corneæ serpens, by Dr. Noyes.

17. Description of a Jaeger's ophthalmoscope, modified by Dr. Strawbridge.

Papers referred to Publishing Committee.

On motion, adjourned.

July 21, 1871.

Society met at 9½ A. M. The President in the chair. Minutes of previous meeting read and approved. Dr. Jeffries offered the following resolutions, which were adopted:

Resolved, That the Committee of Publication be directed not to print any communication unless it has been presented in person by the author at the annual meeting, except it shall have been accompanied by explanations of his non-attendance which shall be satisfactory to the Society.

Resolved, That the Secretary be directed to communicate this vote to the members of the Society before January, 1872.

The Auditing Committee reported the Treasurer's account correct and properly vouched for.

The Secretary moved that the resolution, adopted for two years past, relating to papers to be sent to the Publishing Committee, be reënacted, and that the date of reception of papers be September 1st. Adopted.

The bulletin was next in order.

18. On the tables given by Loring and by Knapp to show the amount of displacement of the retina in ametropia, by Dr. Wadsworth.

19. The halo seen around the macula lutea, illustrated by an apparatus, by Dr. Loring.

20. A scheme for recording cases of asthenopia, and a disk to aid in testing perception of color, by Dr. Noyes.

21. Cases of hemiopia, by Dr. Thomson.

22. The retina an asymmetrical surface, by Dr. Murdoch, of Baltimore; the paper read by Dr. Agnew. Dr. Hay made remarks in criticism of the paper, which he was requested to put in writing for the Publishing Committee, and to send a copy to Dr. Murdoch, who was absent from the meeting.

23. Cases of soft cataract, treated by discission, by Dr. Agnew; read by title.

24. A peculiar case of sub-retinal effusion, by Dr. Noyes.

The above papers all referred to the Publishing Committee.

The Nominating Committee then reported for reëlection the same officers as for the last year, viz.:

President, Dr. H. W. Williams, of Boston.

Vice-President, Dr. C. R. Agnew, of New York.

Recording Secretary and Treasurer, Dr. Henry D. Noyes, of New York.

Corresponding Secretary, Dr. H. Althof, of New York.

Committee on Progress of Ophthalmology, Dr. B. J. Jeffries, of Boston.

Publishing Committee, Drs. Loring, Roosa, and Noyes.

All of whom were duly elected.

The place of meeting to be either Niagara or Newport, the latter was chosen by a vote of eight to three. The time of meeting to be the third Thursday in July.

It was voted that the assessment for the ensuing year be ten dollars, and that the Publishing Committee be authorized to call for an additional assessment if necessary.

After reading the minutes, on motion, adjourned.

Henry D. Noyes, M. D.,
Recording Secretary.

IN MEMORY OF

ALBRECHT VON GRAEFE,

Whose life and work so greatly helped to turn a doubtful specialty into a certain science.

REPORT ON THE PROGRESS OF OPHTHALMOLOGY. By B. Joy Jeffries, M. D., Boston.

For the fifth time as your committee, I would make my report on the progress of our specialty. As I said last year, perhaps a running sketch, without criticism, of what has been published since we last met, will more readily inform those of the profession outside of our specialty what is going on among us, and also save time for some of us who are too busy to keep as thoroughly conversant with others' results as they could wish, and as the ever-advancing science of ophthalmology demands. I would again call attention to the report of our Secretary, Prof. Noyes, published in the New York Medical Journal early in this year. The articles he has there sketched I have, of course, omitted to notice in detail here. It has been fortunate that I could not finish this report till the time it was absolutely called for by the publishing committee, since thus I have been enabled to notice all the material which the war in France and Germany had delayed the printing of, and which, of course, properly belonged to the time when it was ready for the press.

I therefore here give a brief sketch of what has been published, since my last report, in "Graefe's Archiv für Ophthalmologie," now continued by Donders, Arlt, and Leber, the

"Klinische Monatsblätter für Augenheilkunde," the "Annales d'Oculistique," the "Royal London Ophthalmic Hospital Reports," the "Giornale d'Oftalmologia Italiano," the "Archives of Ophthalmology and Otology," and the new Italian journal, commenced this year, the "Annali d'Oftalmologia." I have also noticed some of the books and monographs published, and the scattered articles in various reviews and society reports. Appended is a list of those which time and space have failed me to sketch in detail; the ophthalmic journals where these latter have been discussed will be found mentioned, e. g., Zehender's Monatsblätter, or the Annales, etc.

Again, we would call the attention of our brother ophthalmic surgeons in this country to the fact that the profession at large have a right to demand from them a better *account* of their stewardship at the ophthalmic hospitals and infirmaries now established in our larger cities. Also, we may justly ask in return for a more definite recognition of our specialty on the part of many of the professional schools and colleges.

Ophthalmology has recently lost from its ranks some devoted workers and earnest thinkers. The pens of friends and colleagues have better told than I can here, what our specialty owes to Alexander Quadri, of Naples, and Auguste Serre, of Uzès.

While we were gathering last year from the various parts of this country to our annual meeting at Newport, one of the confessedly greatest clinical teachers and leaders passed away from his life and work. Albrecht von Graefe, I hold, was the greatest scientific practitioner in the medical profession. Higher praise I cannot give. That it is not too great has been amply proved by what has been written of his life and work by his nephew, Prof. Alfred Graefe, in his "Ein Wort der Erinnerung an Albrecht von Graefe," Halle, 1870; Dr. A. Goschen's "Albrecht von Graefe," Berlin, 1870; and Dr. Cohn's "Was verdankt die Menschheit Albrecht von Graefe," Breslau, 1871. An extended compilation of what has been said of Graefe will also be found in the Ophthalmic Hospital Reports, London, which journal, as well as all the other ophthalmic reviews in the different parts of the world, have spoken editorially of Von Graefe in such terms as are applied to but few, and deserved by as few.

Let the commemorative page at the head of this report prove to the profession that our Society recognizes what Albrecht von Graefe has done for us and them.

Archiv für Ophthalmologie, Bd. 16, 1870.

Corneal Abscess. Prof. ARLT.—The clinical reputation of our former master induces us to give in detail his report of treatment. He says, when we have an abscess, we must treat the patient as if already suffering from *iritis*, since this, if not already present, may occur any minute. The eyes are to be protected from strong light and accommodative efforts, and the iris kept under atropine.

As with the open corneal ulcer, so also with the closed (an abscess), we must decide whether pus-formation exists and continues with symptoms of irritation, as ciliary injection, tears, photophobia, and pain; whether, when these cease, the pus-formation stops; or whether the eye is in, so to speak, a torpid condition, with increasing purulent formation. In the first case every thing irritating is to be kept away, and we must use local bleeding, narcotic inunctions on brow and temple, and morphine injections, cooling cathartics, etc., without, however, reducing the strength too much. Simple opening of the abscess or of the anterior chamber in addition will be indicated or demanded on the yellow color of pus showing its collecting in the anterior chamber, the cornea, or both. He perfectly agrees with Weber's advice, to make the opening with an iridectomy-knife below the abscess, thrusting up and backward, making the cut 2½‴ to 3‴. He avoids turning the knife, in coming out, to prevent too rapid evacuation of aqueous, and uses a Daviel's spoon to gradually open the wound, and has fine forceps ready to remove lumps of pus sticking in the cut. He does not consider the perfect evacuation of the abscess or chamber absolutely necessary, since quite sizable remains of pus may be absorbed or extruded within twenty-four hours. He warns against injections, formerly advised. If merely the abscess is to be opened, he uses a cataract-knife, passing it through the under part of the anterior wall, making, not a cataract flap-like cut, but rather a linear or curved section. In regard to Sämisch's proposed plan of opening corneal ulcers, Arlt will not at present decide. When there are only small deposits along the edge to be released, he makes a 1–2‴ long opening on either side. Sometimes a radial cut into the cycle-shaped deposit allows the pus to escape, or two or three such cuts may be made. He uses a compressive bandage tighter at first, covering also the other eye from light, and keeping the patient if possible a few hours in bed. On reappearance of pus in twenty-four hours, he uses a Daviel's spoon to open the wound only when the abscess progresses or severe pain returns. When a necessity for evacuation of the pus shows itself by the third day, or later, he again punctures in the same or a neighboring place. Although the continued pressing open of the wound was recommended by Himly in 1843, yet Arlt does not greatly favor it, since he found no good result after doing it two or three times.

He has had good results from opening the abscess, or the chamber alone, although, in spite of this, a goodly number of eyes have been lost after repeated puncture, where this result was quite unexpected. The patients were, however, all in poor condition, or affected with lachrymal blennorrhœa. He always slits up the lower canaliculus and evacuates the pus in these last-named cases. The excessive pain accompanying these abscesses is best relieved by opening the chamber, and warm moist applications. When pus in the chamber reaches the pupil, puncture is indicated to prevent iritic attachments and pupillary membranes, even when the condition of the cornea or pain does not seem to require it.

Iridectomy he does not so much favor from experience, perhaps, as he says, because he has regarded it as the *ultimum refugium.* It is not so readily done, since the iris may be quite soft.

If, now, we have the pus in the cornea quiescent or progressing peripherically, while the eye presents no conditions of irritation, then opening the abscess or the chamber, or both, are to be thought of; but, at the same time, we must decide whether this torpor is simply local or connected with the strength or spirits of the patient. Anxiety, care, and homesickness, act very depressingly, as if the vascular and nervous activity were paralyzed thereby, and hence digestion and nutrition interfered with. Out-door exercise, stimulants, iron, quinine, and mineral acids, are then in place. Warm cataplasms are to be used only under the physician's eye. Small deposits may be touched, even where there is some irritation, with a sharp pencil of nitrate of silver, to expose the pus there collected.

Above all these absolutely necessary means, Arlt holds a compressive bandage, by which he means such as shall prevent *motion of the lids* quite distinct from the usual compressive bandage of Graefe. He uses also the collodion bandage, which he spoke of in vol. ix., p. 1, when the patient strongly objects to operative interference. In regard to Sämisch's operation so successfully used by himself, Arlt speaks with some degree of reserve. He says it, as all other operations, is to be postponed so long as there is fair hope of succeeding with the lint-bandage. His whole treatment is well worth carefully reading by any one having under his care these ugly forms of corneal abscesses.

Drs. Hippel and Gruenhager continue and finish their article "*On the Effect of the Nerves on Intraocular Pressure.*"

Dr. Monnik describes "*A New Tonometer and its Use.*" From a series of experiments he finds that the tension of a normal eye may vary considerably, rendering it difficult to decide sometimes whether an eye is to be considered hard or soft. Age has an influence on the ocular tension, increasing with it. Tension in myopes was found within the normal range, in hypermetropes as in normal. Tension varies in diseased eyes as in normal ones. With strong convergence, notwithstanding the subjective feeling of tension, there is, in reality, no alteration, contrary to what might have been expected from Dr. Schurman's results in his dissertation on the action of the antagonistic muscles. In reference to the pressure of vitreous and aqueous, experiment shows that the iris, at least after death, offers very little resistance.

Prof. Alfred Graefe reports an interesting case of *Blepharospasmus;* also one of "*A Seeming Perversion of the Law of Concomitant Squint in Certain Forms of Anisometropia.*"

The result of examination educed that, 1. One eye is hypermetropic, while the other may be myopic or emmetropic; 2. There is insufficiency of the R. interni; 3. Each eye has sufficiently good vision.

Now, as was proved, the covered myopic eye *converged*, the covered hyperopic eye diverged. Neglecting to notice this might, in certain cases, lead to practical mistakes.

Dr. Haase reports on the pathological anatomy of a case of "*Coloboma of the iris and choroid.*" It seems the retina may remain intact over a coloboma of the choroid; and, if further examinations should substantiate this, then it must be that the primitive ophthalmic groove closed at the right time, and some days later an interference occurred in the growth and development of the retina.

Dr. Claassen, on "*Resistance to Single Vision after Operation for Internal Squint, in reference to the Theory of Retinal Congruence.*" We give only his closing paragraph: "May not some psychological data underlie the meaning of this case, which may be peculiar to every individual, but not subject to such strict analysis as by the mathematical method; if so, then the principles elucidated are of still greater importance. Comparing the cases similar to this, published by Von Graefe and Alfred Graefe, and we shall find them explainable by the same fundamental laws. Hence the importance of separating the two elements of the visual act as distinct from each other—seeing with subjective visual field, only possible from *a priori* given extended retinal impression, and the projection of the visual field for the purpose of objective vision. The relations of congruence are the immediate result of seeing (Orientirung) in subjective visual field, and the combined use of the two eyes."

Accommodation in Presbyopia.—Drs. Adamük and Woinow report, as the result of absolute measurement, that the posterior surface of the lens becomes more curved in old people in accommodation than has been thought, even as much as the interior surface, but the two curves together are not as much as in young people. They say that, from their present data, they are quite unable to deduce the cause of this; their measurements, careful as they were, answered nothing in reference to the question of accommodation. In the eyes examined they ascertained that the posterior surface of the lens changed, in relation to the anterior surface, more where the pupils were small.

The Movements of the Globe exhibited by the Phænophthalmotrope.—Prof. Donders shows, by a plate, the instrument thus called, which is contrived to exhibit the ocular movements correctly, a very desirable necessity for *teacher* as well as pupil. We must refer to the plate and article for his explanation, as without the former the latter would be unintelligible if here introduced.

Accommodation and Refraction. Dr. Schneller.—From a series of experiments we cannot here introduce, it is rendered probable that accommodation may take place differently in the two eyes, and that this variation, at least in myopia, may affect the refraction. This, once granted, gives us a further insight into the causal relations of many diseased conditions. May there not be a connection between this difference of accommodation and the fact that, in myopia, the right eye generally turns outward (in more than three to one of the cases), because there is here an anomaly of the accommodative position? It may be found in practice that more severe choroidal changes and deleterious affections of the eye are in myopia more frequent in the right than left. This would point toward taking care, in the selection of glasses for myopes, to consider this disposition of the right eye to injure itself by excessive accommodation.

The Contest of the "Nativisten" and "Empiristen," although a philosophical one, may be thus of eminent practical importance, and induce ophthalmic surgeons to test experimentally this question, and see whether Dr. Schneller's results are individual or general.

Contention of the Visual Field. M. Woinow.—This is a condition caused by exhibiting to each eye different pictures or visual fields. In some cases the dominant contour or color alternates; in others, the color of the whole field is more steady; and again, in others, we have the so-called glance or shimmer. Woinow found that the difference of the pictures to be combined may depend on variation in form; or, if the form is the same, it may be due to difference in color or brightness; or, thirdly, it may depend on the clearness of the groundwork of the picture. In general, our *degree* of attention governs the perception of form. If we pay special attention to the bodily form of the picture, then the differently-colored outlines of the two stereoscopic pictures are seen side by side; if, on the other hand, we carefully examine the special details of the picture, then the "contention" takes place, and our will completely controls the appearing of one or the other picture. A general law held good that the contention was greater when the individual points of the picture were fixed, or when the color alone of the combined field was tested, especially if one of the combined surfaces was uneven. On the other hand, the contention was least when our attention was simply directed to the bodily form. As to the color of the common field, this is more quiet the less there is of contrast in the two fields (red and orange, orange and yellow, blue and violet, etc.). If there is considerable difference in the lightness of the two fields, then the common field shimmers.

As to this glance or shimmer, it is stronger the greater the contrast of the two fields in color and brightness; the latter, however, affects it most. The brighter the one and darker the other field, the stronger the shimmer; for instance, a black and a white surface. When we close one eye, and again presently open it, the common field appears more of the color which is now presented to the reopened eye. Occasionally, during certain moments, the alternating colored spots in the common field began to appear close to the object delineated, and at first took the form or figure which they would assume as after pictures.

On Color-perception. Same author.—By a series of careful experiments with colored papers, etc., Woinow has found that red appears yellow as soon as it is removed from the optic axis, and gradually shades into yellowish brown, becoming darker the farther removed it is, till finally it seems black. This last, however, greatly depends on the ground on which the color lies. If the ground is brighter than the color examined, then the peripheric perception of the color will be black;

gray, on the other hand, if the ground is much darker than the color. Orange thus becomes yellowish and gradually dirtier, to a peripheric gray of varying brightness, in accordance with the ground it is on. Yellow appears gradually less deep, more whitish, and on the periphery seems almost a clear white. Green exhibits in this method of examination very peculiar appearances. It becomes laterally yellowish. Some greens give at certain spots a good clear yellow. Toward the periphery of the visual field it becomes dirtier, and finally ends in gray, of varying brightness, in accordance with the ground it is seen on. Like yellow, it never appears black on the periphery, as the other colors. A peculiar phenomenon is noticeable, when we view the spectrum with one eye directed to the red end. We then see first red, then a broad streak of yellow, and finally blue. Green will not be seen as such, but as yellow. Violet is also not visible.

Blue becomes less intense—a grayish blue. On the periphery it appears black. If the ground is too dark, it gives the impression of gray. Violet passes into blue, quite a strong blue at some portions of the visual field. On the periphery it acts as blue. Purple red passes into a dark violet, then into deep blue, and finally, on the periphery, acts as blue and violet. The changes depend principally on the degree of saturation, that is, whether it is a pure purple red or a more rosy red. On the periphery of the visual field, where we have no definite differences of color-perception, and only can distinguish between light and dark, all colors give, according to their ground, varying shades of brightness. The borders, where differences of color stop, are very definite, and are not dependent on the ground of the color. The border-lines of the visual field for differences of brightness vary, and are greater the greater the relative difference between the brightness of the pigmented surface and its ground.

On Binocular Vision. Same author.—He proposed three experimental questions, namely: 1. The examination of the contraction of the visual field in accommodation for the near; 2. The condition of the eyes in observing objects at different distances from them; 3. The accommodation individual to each eye during binocular vision of laterally disposed objects. Contrary to Hering's results, he finds under the first head that the excursive power of the eyes is not limited in accommodation. The visual field alone, not the "Blickfeld," is contracted. From his experiments he also deduces that, in monocular vision, when the eye alternately focuses for objects at different distances, it does not necessarily undergo any convulsive action, but simply changes its accommodation; this, of course, only when all the objects fixed are in one and the same line coincident with the visual axis.

In careful binocular fixation of lateral objects, the accommodation of the two eyes varies, the eye nearest the object accommodating more strongly than the other.

Hence, from all Woinow's experiments, he deduces that there is not exactly the same innervation in reference to accommodation and movements of the two eyes in binocular vision, and that it is therefore impossible to reduce the action of the two eyes to that of one double (Cyclops) eye, as Hering has proposed.

In reference to the Angle Alpha. Same author.—An additional article to his previous ones. In this he concludes: 1. That the angle a and y not only vary in size, but have a different meaning; 2. That the angle a is of great importance as respects the elliptic and dioptric condition of the eye, and changes in accommodation, but has nothing to do with the refraction and position of the eyes; 3. That the angle y, which is quite independent of the accommodation, has a certain connection with the refraction and positions (movements) of the eyes; 4. That the angle a can only be measured according to the principle of Helmholz's method, and the angle y only according to Donders.

Rotation-point of the Eye. Same author.—Woinow, from experiment here declares that there is but one point of rotation in the eye. He holds that the eye not only turns round a fixed point, the rotation-point, when it passes from a primary to a secondary position, but also when it passes from a secondary into any other, and the changes of accommodation, as he has convinced himself, do not affect the rotation-point, as this remains unchanged.

The Intensity of Color-perception. Same author.—From a series of extremely interesting experiments, Woinow concludes that the strength or intensity of color-perception is less than that of light-perception (shades). It is also different for different colors, independent of the brilliancy of the color or of the ground on which this is seen.

Experimental Research into the Diseases of the Optic Nerve consequent on Intracranial Troubles. Prof. Manz.—He found that, as soon as even a little fluid was thrown beneath the cranial wall, there was seen a filling of the retinal veins, most visible on their first subdivisions; the arteries and capillaries showing varying conditions. Thus, increase of the venous calibre, and their tortuosity up to pulsatory movements, are of course the consequence and expression of a stasis which the venous blood has met with somewhere between the optic-nerve entrance and the vein into which the vena centralis retinæ empties.

Woinow noticed also constantly a contraction of the pupil, certain rotations of the globe, and closure of the lids. As soon as a certain amount of fluid of any character entered the cranium, a contraction of the pupil quickly followed, generally quite considerable; it was a sign that, if the animal's life was to be saved, the injection must cease, or else the experiment was rapidly fatal. This is of course at variance with the assumed position that cerebral pressure causes dilatation of the pupil. With this contraction of the iris there was always, as said, rotation of the globe and closure of the pupil; the rotation was upward, often accompanied also with a strong rotation on the visual axis.

Some Rare Ocular Tumors. Drs. Hirschberg and Happe. —1. Glioma retinæ endophytum. In a young infant. No neoplastic growth in the uveal tract; it evidently started from the *pars ciliaris* and the neighborhood of the retina, and was microscopically undoubted glioma.

2. Sarcoma of the choroid and secondary tubercles in the retina and sclero-corneal region. Choroidal sarcoma occurred in a child twelve years old. The growth was free of pigment. The *secondary* tubercles in the retina came with *primary* choroidal tumor. Three interesting points.

Motions of the Hypermetropic Eye. Dr. Kugel.—The result of testing his own hypermetropic and astigmatic eye was to formulate this, namely, that it differed the least from the normal eye in those positions which are mostly used in looking at distance or near; and the abnormal turning and variations in elevation were more prominent the farther the eye moved from these positions. Thus it would seem that these accustomed positions were, so to speak, cultivated at the cost of the other less frequently used ones, since the ocular muscles in their development are accommodated to the special needs of accurate vision in the most usual position of the globes.

Development of Acute Myopia. Same author.—From two cases reported, Dr. Kugel believes himself justified in assuming that lengthening of the bulb may take place in exceptional cases where there is no predisposition; this change is due to alteration of the tissue of the sclera, this coat not preserving resistance sufficient to withstand the normal pressure within the globe, a condition dependent on concomitant intracranial, retrobulbar, or subconjunctival processes, or from inflammations within the globe in which the sclerotic has participated.

Effect of the Crystalline on Tension of the Iris. Same author.—His arguments show that the lens does cause a certain tension of the iris. He also shows that increase of vitreous does not press the lens forward.

Trichiasis Operation. Same author.—Dr. Kugel has operated on five hundred the last two years, and devotes a few pages to speaking of his results, and the various well-known operations as compared with each other.

A Ready Method of detecting Monocular Simulated Amaurosis or Amblyopia. Same author.—This depends on the fact that, if we hold a colored glass before the eyes, and at one side it is not transparent, we shall not be able to say, offhand, with which eye we are seeing, especially when the eyes have nearly equal power of vision. Monocular defects may also thus be demonstrated.

A Case of Acute Atropine-poisoning. Same author.—There was coma for sixty-two hours (the patient being fed by enema), before any reflex action was noticed, this latter consisting of a slight contraction of the lid to bright light. The case was treated by repeated subcutaneous injections of morphine.

Inflammation of the Ciliary Region as Sequela of Febris Recurrens. Dr. Logetschnikow.—An epidemic of *febris recurrens* in Petersburg and Moscow gave the doctor opportunity to observe this peculiar affection, already spoken of by others, as Middlemore and Himly. He saw over seven hundred cases, and holds to his previously-expressed views that it is an inflammation of the ciliary body tending, but not always, to run over to the iris. It occurs in from a few days to several months after the fever. Cases occurred when it came on during convalescence, but the eyes were never affected *between the attacks.* A more complete article in reference to the nomenclature and true position of this disease will appear as a separate publication.

Archiv für Ophthalmologie. Albrecht von Graefe. Vol. xvii., part 1, *continued under* Arlt, Donders, and Leber.

The Development of Myopia, based on the Examination of the Eyes of 4,358 *Scholars, Girls and Boys.* Dr. Erismann, St. Petersburg.—We can here only give a glance at these extremely interesting series of observations made at St. Petersburg in seven *gymnasia* with scholars from 10 to 21 years of age; one progymnasium, four German schools (boys and girls), 8 to 20 years of age, and a female gymnasium for the education of teachers, of ages from 17 to 24. Whole number examined 4,358.

Myopes	1,317	=	30.2 per cent.
Emmetropes	1,132	=	26. "
Hypermetropes	1,889	=	43.3 "
Amblyopes	20	=	0.5 "
Total	4,358		100 per cent.

Among 3,266 boys, there were

Myopes	1,017	=	31.1 per cent.
Emmetropes	867	=	26.5 "
Hypermetropes	1,369	=	42. "
Amblyopes	13	=	0.4 "
Total	3,266		100 per cent.

Among 1,092 girls, there were

Myopes	300	=	27.5	per cent.
Emmetropes	265	=	24.2	"
Hypermetropes	520	=	47.7	"
Amblyopes	7	=	0.6	"
Total	1,092		100	per cent.

Among 2,534 pupils of the Russian Gymnasia there were

Myopes	866	=	34.2	per cent.
Emmetropes	654	=	25.8	"
Hypermetropes	1003	=	39.5	"
Amblyopes	11	=	0.5	"
Total	2,534		100	per cent.

And among 1,824 pupils of the German schools, there were

Myopes	451	=	24.7	per cent.
Emmetropes	478	=	26.2	"
Hypermetropes	886	=	48.6	"
Amblyopes	9	=	0.5	"
Total	1,824		100	per cent.

The author concludes that between six and seven years of age still more hypermetropes will be found. He found in the lower classes two-thirds of the children thus, and even one-third in the upper classes. Remembering that, without atropine, hypermetropia cannot always be determined, it would seem that it is the normal, the common, condition of refraction of the young uninjured eye; and what we call emmetropia, or still more, myopia, is an exceptional condition for this age. A small part of these large number of hypermetropes remain so; the majority become myopic after passing through a condition of emmetropia.

Cohn says it seemed as if myopia was transmitted from mother to daughter, or from father to son. Erismann says he cannot confirm this, only that with myopic girls the number of myopic mothers is greater than with myopic boys. The number of myopic fathers of both boys and girls was decidedly greater, being 57.6 per cent.

He deduces that the use of concave glasses in itself has a bad effect on the eye while its condition of refraction is in a process of change, and it is a misfortune to be obliged to order glasses for a young myope. Their use should be limited as much as possible; music, drawing, etc., should be forbidden when the object must be brought very near, or glasses be worn. This, of course, refers to progressive myopia of youth, but is of the greatest importance here. The wish to see in the distance does not countenance glasses; it is time enough when these myopes wear a glass after the tissue of the bulb has become firm. When absolutely necessary at school, a lorgnette can be used.

The increase of myopes among the older school classes of more years' study shows that it is the occupation, with all its concomitant circumstances, which produces this condition.

The becoming myopic of a hypermetropic or emmetropic bulb depends on the lengthening of its axis. Erismann says he is perfectly convinced and sure that by far the principal cause of this myopic globe is the working at badly-constructed school-desks, and inadequate and bad light.

We have but sketched a few sentences, to lead our readers to carefully study through Dr. Erismann's article, which should be seen and understood by all teachers and school-committees.

Support of the Eye during the Expiratory Pressure of Blood. Prof. DONDERS.—He concludes that the *external* vessels of the eye, as well as the *intra-* and *retro-ocular* are distended during expirations. The closure of the eyelids either limits or entirely prevents this, partly from pressure, partly, perhaps, from certain associated action. It was noticed that during every increased expiratory pressure the lids were closed or tended to close. Hence, closing the lids, combined with the action of the ocular muscles, prevents injury from blood overfilling.

Movements of Eyes. Dr. SKREBITZKY.—His experiments show:

1. That bending the head toward the shoulder while keeping the eye fixed on a point at the height of the eye, and firmly attached to the head, caused for short distances a real movement of the eye around its visual axis in a direction contrary to the movement of the head, but not to the degree assumed by Hueck.

2. That there is an undoubted proportion between the lateral turning of the head and the movement of the eye. For himself, he found this to be for ten degrees of lateral motion of the head about one degree of movement of the eye around its visual axis.

Cerebral Atrophy of Optic Nerve, with Pressure Excavation of the Optic Papilla. Dr. Schmidt.—He thinks his case may have some meaning in reference to others diagnosticated as *glaucoma simplex*, simply from the pressure excavation, and in which iridectomy was of no possible avail.

Sensitiveness of the Eye for Spectral Colors. Dr. Lamansky.—A series of experiments has shown that our eyes are more sensitive to green, yellow, and blue, and less sensitive to violet, orange, and red, than to white light, so that, by experiments with color-sensation, the brightness of white is not exactly unity for the other colors to be compared with, as Aubert held in his experiments.

Negative After-Pictures. Drs. Adamük and Woinow.—Their experiments gave the following results:

1. Peripheric after-images, produced in broad daylight, appear in different colors than central ones.

2. The duration of the impression of the primary light has no effect on the color-tone of the after-image.

3. The difference of color-tone of the peripheric after-images takes place in all meridians from the centre.

4. In reference to the difference of the colored after-images, the whole retina may be divided into zones, which perfectly agree with those of color-impression in general.

The experiments showed also: 1. The duration of the after-image is in general not only subject to individual variations, but varies also in the same person. When several experiments are made in succession, the second in the same way and intensity as the first, then the variations amount to only one to two seconds.

2. The central after-images last longest, especially those with binocular fixation. This is explainable by the fact that there is less effort in binocular than in monocular fixation. The after-pictures from double images last a shorter time, as both experimenters found, and shorter with convergent than with parallel visual axes.

The duration of the after-image from different pigments (seen on variously-colored grounds) is about the same; the difference of duration is so slight as to prevent our deducing any special effect of the ground color on the retina.

Changes of the Pupil during Accommodation. Drs. Adamük and Woinow.—From experimental observation they conclude that in general, during accommodation, the centre of the pupil tends inward from the optic axis; this tendency, however, is not in proportion to the accommodation. Moreover, this tendency only shows itself when the fixation changes from the far to the near point of the eye; that is, when the whole range of accommodation is called into play. When the whole range is not called for, as in changing from one to a neighboring point, then there are variations from the law above given; the pupil's centre tends outward from its former position, in which a more distant object was being gazed at.

Contributions to the Pathological Anatomy of the Eye. Dr. Berthold.—1. Total sclero-choroideal staphyloma, vascular formation in the cornea and vitreous, atrophy of the uveal tract, congenital posterior capsular cataract.

2. The alterations of the eyeball occurring in meningitis. These he found to be: 1. Due to a spreading of the inflammation of the meninges to the globe; 2. This takes place through the lymphatics by the optic canal; 3. According to the intensity of the extended inflammation and the exudation thereby existing in the lymphatics of the eye, we have either a filling of Tenon's space with chemosis conjunctivæ, or a filling of the subvaginal room with stagnant papilla and neuritis optica, or, in the worst cases, to purulent retinal and vitreous inflammation; 4. Iritis and irido-choriditis in meningitis are consecutive.

Three Cases of Phthisis Bulbi, Sequelæ of Melanotic Choroidal Sarcoma.

A Case of Granuloma Iridis.

Bony Formation in Choroid, New Growths in Vitreous, Peculiar Condition of Optic Nerve.

Historical Notice of Morbus Basedowi, with reference to twenty Cases of the Disease seen by Dr. Emmet, who says it should not be called *Morbus Basedowi*, or *Graves's Disease*, but properly *Parry's Disease;* why, we must refer our readers to the article.

Abuse of Spirits and Tobacco as Causes of Amblyopia. Dr. HIRSCHLER.—He thinks the abuse of both together the special cause of the disease; but, besides, must be reckoned all the additional conditions, hyperæmia of the brain, overwork of the eyes, producing troubles of the circulation within the globe, and individual peculiarities and dispositions. Prognosis is good if alcoholism has not proceeded too far; alcoholic amblyopia does not necessarily lead to optic atrophy; here "cessante causa, cessat effectus," leading in the first stages to complete recovery. When changes appear in the papilla the *restitutio in integrum* is no longer to be hoped for, yet a cessation of the process may occur and the visual power present be retained. The first indication for treatment is the removal of the cause; treatment of "magenkatarrh," strict diet, and open-air exercise. The author does not think much of antiphlogistic treatment often recommended, and only in place where there are internal hyperæmia of the globe and textural changes. Goudret's salve he has used very frequently.

True Rolling of the Eye around its Visual Axis. Dr. NAGEL.—This is a second article, which goes with one by Nagel, in the fourteenth volume of "Graefe's Archiv." He here says that it is a rule, when the head is bent toward the shoulder, the eyes turn in the opposite direction, around their visual axis, about the sixth part (measured by degrees) of the movement of the head. The object of this seems to be to assist the sensation of poise (Gleichgewichtsgefühl). The degree and direction of this rolling of the eyes depend on the lateral movement of the head from the upright normal position, no matter how this latter is accomplished.

Thirty-eight Cases of Accommodative Paralysis. Dr. SCHEBY-BUCK.—In nearly all these cases, dependent on different causes, a tonic treatment was pursued, combined with Calabar bean, which proved of great therapeutic value. He found: 1. Mydriasis in only one case of diphtheritic paralysis. In the other cases it occurred in only a small proportion. Mydriasis, when present, does not exactly coincide with the paralysis of the ciliary muscle. 2. Loss of refraction occurred;

always disappearing with the disease. 3. Occasionally loss of visual power was observed, depending perhaps on astigmatism of the lens, and disappearing with the accommodative paralysis. 4. Diagnosis can often be made by observing the absence of change of shape of the lens in changing accommodation. 5. Accommodative paralysis occurs with diphtheritic wounds. It has also been certainly seen in sausage-poisoning.

Clinical Cases. Dr. Landersberg.—They are as follows: 1. A peculiar form of epidemic ophthalmia. 2. Further contribution to the essentials of phthisis bulbi, in which he says some of the inflammatory processes of the cornea may also become the source of secondary glaucoma. 3. Chronic idiopathic œdema of the left upper lid and conjunctiva bulbi.

Anomalous Forms of Retinitis Pigmentosa. Dr. Leber. —(The new additional editor of this [Graefe's] Archiv.) He makes the following divisions:

1. Typical retinitis pigmentosa.

2. Retinitis pigmentosa with typical disturbance of vision and anomalous ophthalmoscopic appearances. Here belong:

a. The long-known retinitis pigmentosa *without pigment*, which passes with all possible shades into the common form. It shows that the essence of the process is not the pigmenting but the accompanying interstitial hypertrophy of the retinal neuroglia and atrophy of the nervous elements. In general, the ophthalmoscopic appearances are characteristic enough for diagnosis, even when pigment is absent.

b. Retinitis pigmentosa with disseminated atrophic masses in the choroid.

3. Retinitis pigmentosa with typical ophthalmoscopic appearances and anomalous forms of visual disturbance.

a. Retinitis pigmentosa with prominent loss of central vision.

b. Retinitis pigmentosa with typical ophthalmoscopic appearances and good central vision, but with variations in the other symptoms of visual power.

4. Retinitis pigmentosa with anomalous ophthalmoscopic appearances and anomalous visual disturbances. Here the most numerous are:

a. Amblyopia or amaurosis, congenital, from retinitis pigmentosa.

b. Retinitis pigmentosa, not congenital, with principally central amblyopia and absence of retinal pigmenting.

c. Chorio-retinitis pigmentosa with anomalous symptoms.

5. Retinitis pigmentosa with varying course, unequal affection of the two eyes. Dr. Leber says that what he has presented naturally tells us nothing of the cause of retinitis pigmentosa, and is but a slight contribution to the material facts. It may be at least assumed that retinitis pigmentosa is on the whole a many-sided affection. If we would retain the name of retinitis pigmentosa for the typical cases, we must grant that it shades through many variations into the allied forms of this disease, and can be considered but as one of several related affections, which is dependent on the parents' consanguinity, or is hereditary.

Needle-Forceps, a New Instrument to form Pupils in Tough Membranes. Dr. Heymann.—It can hardly be clearly understood except by seeing the accompanying woodcut of it, which we cannot here reproduce.

Archives of Ophthalmology and Otology, vol. ii., No. 1.

Formation of Bone in the Eye. Dr. Knapp.—His conclusions are:

Formation of bone in the eye is the consequence and final stage of a plastic inflammation of the capillary layer of the choroid. It invests the inner surface of the choroid, and continues, in the form of a transverse septum, through the anterior part of the vitreous humor, behind the ciliary body and the crystalline lens, without, however, involving these structures. The diseases which lead to ossific productions are chronic inflammations of the interior coats of the eye, called internal ophthalmia by the earlier, irido-choroiditis by modern writers. It should be particularly mentioned that chronic plastic inflammation limited to the ciliary body and iris, irido-cyclitis, which is not uncommon, and leads to the formation of false membranes before and behind the crystalline lens, has not been found to generate osseous tissue, nor has ossification been demonstrated as a sequel of iritis alone.

The diagnosis of ossification may be based upon the unyielding and hard condition of the posterior part of the globe, terminating about two lines behind the cornea, while the anterior region is soft, or at least impressible.

Simultaneous occurrence of calcification and ossification is frequent. Calcification may be diagnosticated by atrophy or degeneration of the iris, in combination with a shrunken, white or yellowish cataractous lens. As ossification does not involve the outer choroidal layers, nor the ciliary muscle and iris, it in itself is not to be dreaded as a cause of sympathetic ophthalmia. The latter can only result from irido-cyclitis supervening as a complication to ossific choroiditis. As long as an eye, in which ossification has been diagnosticated, remains free from irritation, and its fellow also, the removal of the former, for fear of sympathetic inflammation, is not indicated.

A Case of Glioma Retinæ, operated on at an Early Stage, and exhibiting some New and Peculiar Anatomical Conditions. Dr. Knapp.—He concluded that the very early removal of the whole organ was, therefore, a step approaching the practical solution of the question on morbid growths in general, and on intraocular tumors in particular—a question which, as a maxim, may be expressed thus: extirpate when the tumor is still a local disease, that is, before infection of the system has begun, and life will be saved.

Case of Pterygium superius. Dr. Knapp.—It resulted from an attack of blennorrhoic conjunctivitis in a child of eleven years of age, and seems to us more properly classified with symblephara, as he says most of the cases reported are.

Tumors of the Retina. Dr. Delafield.—He draws these conclusions:

1. The rule laid down by Hirschberg, that retinal tumors grow outward toward the choroid, has many exceptions.

2. The elements of these tumors only resemble the granules of the retina when altered by reagents and seen with low powers. When examined fresh and with high powers, they are seen to be identical with so-called lymphoid cells which compose so many new growths.

3. If we dismiss from our minds the superficial resemblance between the elements of these tumors and the retinal granules,

they at once take their place in the class of round-celled medullary sarcoma.

4. The variation in the size of the cell-body, and in the proportion of stroma in different parts of these tumors, is almost always found. This variation is the same which we find in most sarcomata, and is no reason why we should speak of a tumor as beginning as a glioma, and then becoming sarcomatous.

5. Not only the anatomy, but also the clinical history of retinal tumors, corresponds exactly with those of the medullary sarcomata.

6. The development of secondary tumors follows the rule laid down by Virchow for sarcomata, and occurs: 1. By continuous infection of the retina, optic nerve, and, perhaps, the brain. 2. By discontinuous infection, forming the choroidal, scleral, and episcleral tumors. 3. By metastasis proper, forming tumors on the bones, lymphatic glands, and liver.

The idea that the choroidal tumors are formed by continuous infection from the retinal tumors, and that the scleral and episcleral tumors are formed by continuous infection from the choroidal tumors, seems to be erroneous. In the very great majority of sections these tumors are evidently discontinuous. And even if in some few instances a scanty cell-communication is found between the two, it seems most probable, from what we know of other sarcomata, that this is a cell-growth posterior to the development of the secondary tumor. That, however, these secondary tumors, although discontinuous, are produced from cells which have wandered from the parent tumor, is possible.

Special Application to the Case of the Eye of Knapp's General Formulæ for Astigmatic Rays. Dr. Hay.

Iridectomia without Division of the Sphincter Pupillæ. Dr. Pope.—He has performed six operations, in cases which he says may come under the four following classes. The operation is of course optical, not therapeutic:

1. Those in which there is a central opacity of the cornea, and in which there has been acute or chronic internal inflammation of the eye, with or without adhesions of the iris to the lens capsule.

2. Those in which there has been perforation of the cornea with prolapsus of the iris, the pupil having suffered displacement, and being totally or almost entirely placed behind more or less opaque cornea. In case the cornea has suffered very decided changes in form, not amounting, however, to staphyloma, the operation is most strongly indicated. If there be present in the case iritis, or irido-choroiditis, which does not yield to treatment, it may be best to operate with division of the sphincter. If the pupil has been drawn to a very eccentric portion of the cornea by the prolapsus of the iris, it may still be best, in some cases, to excise the iris rather largely, without dividing its sphincter. When the whole pupillary margin has been engaged in the corneal opening, the operation for displacement, and that for iridectomia, after the usual method, are of course excluded.

3. Cases where there is diffuse opacity of the cornea, most marked centrally, and gradually diminishing toward its circumference, together with iritis or irido-choroiditis, with or without adhesions of the pupillary margin to the lens capsule.

4. Cases where an extremely eccentric pupil may be required, and internal disease of the eye may exist. It may even be best in this class of cases, when no actual disease is present, but when there is doubt as to whether the iris will allow of extreme displacement of the pupil without inflammatory reaction. This condition might be found in the cases of old persons in whom the pupil was rigid and but slightly dilatable by the action of atropine. Prof. von Graefe recommended the use of Calabar bean in order to contract the pupil preparatory to the operation for iridectomia, in those cases of glaucoma where the pupil is evidently dilated. It may be in some cases beneficial in the proposed operation, when the pupil is large, and the pupillary margin free. The bean was not found necessary by Dr. Pope, to whose paper we refer for the technic of this operation.

The Light Streak seen in the Centre of the Retinal Vessels with the Ophthalmoscope. Dr. Loring.—In last year's Transactions of our Society.

Observations on Cases of Paralyzed Accommodation. Dr. Colsman.—He reports cases due to the following causes: un-due exertion; straining the eye during work over a bright fire; Hm; sequel of *rubeola;* after angina; still another case from the same; accompanying mydriasis; syphilis; after iritis serosa from herpes zoster ophthalmicus; syphilis.

Kerato-conus and its Treatment. Dr. STEINHEIM.—Three cases operated on by Von Graefe's method. An addition to the already published cases, and, if they do not differ from the others, yet, in their details and especially in their results, are sufficiently worthy of mention to direct attention again to this method of treatment, and assist in giving it its proper place in the manuals of ophthalmology. The patient in one case drew the illustrations himself.

Annales d'Oculistique. May, 1870, *to June,* 1871, *inclusive.*

Retinal Anæsthesia. Dr. A. SICHEL.—By this term he means, not the absence of perceptive power in the retina, but the loss of transmission to the brain of the impressions perceived by it. In these conditions the retina perceives or receives the impression, but the patient is unconscious of it. Retinal anæsthesia generally occurs suddenly after some violent impression has affected the moral faculties of the patient a longer or shorter time. It will not appear at the time, but, sooner or later, some days afterward. There are no objective symptoms; the ophthalmoscope reveals nothing; phosphenes exist in every direction; the pupils act normally to light. Under examination with prisms the muscular action is perfect. Examination of the visual field affords us the only precise data. It is generally concentrically reduced, or we have scotoma, or, what is especially interesting, multiple variations. The patient's symptoms vary from slight amblyopia to complete amaurosis. Photopsy, photophobia, and achromatopsy, are observed in nearly every case. Often, vision is reduced to one-half or one-third. The disease may last a variable time, generally better and worse at times, as proved by the variations in the field of vision. Yet the affection seems to be quite benignant, always ending in recovery. As to treatment, this is to be especially directed to the general condition, and so determined by each individual case. Protection of the eyes from light, as much as possible, is the local treatment necessary.

Caries of the Orbit. Dr. Jules Sichel.—Published after his death, by his son, Dr. Arthur Sichel. This is a very interesting and instructive memoir, which Sichel commenced in 1840. It makes some 55 pages in the Annales, which we would gladly quote from, had we room here. It is based on the absolute experience of Sichel, *père*, and would be quite acceptable published in English as a monograph.

Clinical Observations. By Dr. Lebrun, of Brabant.—Epithelial tumor of the globe. Dermoid tumor of globe. Foreign body in the iris. Traumatic division of rectus internus five years previous; divergent strabismus; proraphie, cure.

Abscess of the Cornea. Prof. Arlt.—Translated by Dr. Schobbens, from vol. xvi., part 1, of Graefe's Archiv.

Table of Reciprocals, Dr. Schobbens, whom we should thank for the necessary calculations he has made for this table, by which we can readily calculate the effect of our combinations of glasses.

Pure (essentielle) Phthisis Bulbi. Dr. Swanzy.—A case observed at Graefe's clinique to be compared with others. Vide Arch. für Opth., xii., 2, p. 256; xiii., 2, p. 407.

Ophthalmia of Scrofulous or Lymphatic Children, and the Employment of an Ointment of Tannate of Lead. Dr. Schoenfeld.—The ointment is prepared by triturating ʒ iss of tannate of lead with ʒ iij of fine oil and ʒ j of fresh lard, carefully washed. This the author speaks highly of in scrofulous ophthalmia of children.

International Tests for the Acuity and Range of Vision. Dr. Burchardt.—These have now been published, and we would call especial attention to them.

Clinical Report of Dr. Hirschberg.—Embolus of central retinal artery. Sudden blindness in an infant of eight months. Several cases of *membrana pupillaris perseverans.*

Artificial Fistula of the Cornea when this is so altered as to cause Blindness. Dr. Gradenigo.—He reports a case certainly successful enough to induce one to attempt likewise to cure the blind.

Ophthalmic Répertoire. Dr. Warlomont.—He wants others to follow him and print individual ideas about various ophthalmic matters. He speaks of ocular inflammations; tincture of iodine with morphine in painful symptoms; local sublimate baths; ointment of balsam of Peru; lance-knives in iridectomy; how to remove suture-needles without separating the wound; circumcision of the cornea.

Strabismus. Dr. JAVAL.—The first and second parts of an article which will prove as practical as interesting. We commend its *study.*

Deafness in its Relations to Panniform Keratitis and Conical Incisor Teeth. Dr. DAVIDSON.

Some Forms of the Intermittent Affections of the Eye. Prof. QUAGLINO.—Translated by Dr. Delstanche, from the *Annali di Ottalmologia*, vol. i., 1871.

Retinitis Pigmentosa; its Locality and Nature. Dr. WINDSOR.—Translated from the Manchester Medical and Surgical Reports. The conclusions are—1. That in certain, probably in the majority of cases, the trouble commences and is localized in the external layers of the retina. 2. The affection is probably inflammatory, and the processes inflammatory or nutritive in the adjacent portion of the choroid, the deeper layers of the retina and optic nerve, vitreous and lens, are secondary.

Opistoblefari. Dr. ALBINI.—Metallic plates to slip under the lids and compress or retain the globe in staphyloma, etc. Also to protect the globe when caustic is applied to the lids, and likewise to keep off the pressure of the latter. To protect an ulcerated cornea. They may be used like artificial eyes, and, when there is any vision, glasses may be set in them. They can be used to apply electricity to the eyeball.

Some Considerations on Color-Blindness. Dr. GALEZOWSKI.—From his researches, based on the examination of more than seven hundred and sixty-six patients affected with internal troubles of the eye, he would make three varieties of chromatic trouble. 1. Pathological contrast of colors. 2. Blindness to colors. 3. Scotoma to colors. The first occurs from the abuse of alcohol, and is seen in certain varieties of alcoholic amblyopia. He saw it thirty-four times in one hundred and thirty-three patients, i. e., twenty-five per cent.

Pathological blindness to colors occurs with optic atrophy and amblyopia from alcohol, hysteria, or syphilis. In the progressive atrophy of the papilla there is often noticed a peculiar variety of dyschromatopsy, and that is, blindness for green first, and after for red. Nearly all patients mistake green for gray, and, as the trouble increases, red becomes more and more dull, changing to brown and afterward black.

Hysterical amblyopia occurs most frequently in one eye, and that the left. The patients lose the power of distinguishing colors. Thus, yellow and rose appear white, while green, crimson, and blue, are black.

Optic neuritis, hemiopia, and other varieties of cerebral amblyopia, are often exempt from color-blindness. Of thirty-five cases he found chromatic trouble in but five; one patient could not tell yellow or blue, the other three confounded red and green. Inability to distinguish yellow indicated a syphilitic cause, and the optic neuritis was accompanied by choroiditis and syphilitic retinitis.

Albuminuric retinitis causes very irregular color-blindness; more often the patients recognize the principal colors, and only confound the secondary shades. Some remark a peculiar central scotoma. Glycosuric retinitis is rare, and produces color-blindness only when accompanied by atrophy of the papilla.

Congenital pigmentary retinitis does not generally cause color-blindness. Of twenty-one patients three only could not distinguish green, blue, and yellow; red appeared of a deep violet. This alteration of chromatic faculty is observed always at an advanced stage when the region of the macula lutea is invaded by pigmentary infiltrations.

In syphilitic choroido-retinitis the patients do not recognize yellow, the color last lost in cerebral atrophy of the papilla; blue and green are frequently lost; red often appears black.

Central Scotoma for Colors.—This is probably due to alterations at the macula, and to certain varieties of atrophy of the papilla. Retinal apoplexies occupying the region of the macula often temporarily or permanently compromise central vision.

In a number of cases of retinal detachment there was observed a peculiar chromatic trouble, namely, colored vision, appearing either before the disease or during the first days of the detachment. The patients state that for some days, weeks, or even a longer time, they have seen every thing colored blue or violet. This is remarked most frequently during the first days of the trouble. Lights, the flames of lamps or candles, appear quite bright, and of a beautiful blue, sky-blue, or sea-blue. In fifty cases of detachment this was observed sixteen times.

Zehender's Klinisch Monatsblätter für Augenheilkunde, February, 1870, to May, 1871, inclusive.

Description of a New Ophthalmometer. Dr. Emmet.

Still another Ophthalmometer. Dr. Zehender.

An Exquisite Case of Monocular Triplopia. Dr. Dufour.—Caused by an eccentric pupil, and two additional holes through the iris.

Exophthalmos from Orbital Aneurism. Dr. Shiess-Gemuseus.—Treated with partial success by ergot-injections, digital compression, and ligature of the carotid.

Graefe's Peripheral Linear Section, Dr. Steffan, who now accepts Graefe's assertion that the largest lens may be removed through a cut of 4.5''' inner length, and 0.5''' height of flap.

Aphorism on the Success of the New Cataract Operations. Dr. Stilling.—He attributes this success to the cut being subconjunctival.

Acute Neuritis Optici with Tumor of Brain. Dr. Schiess-Gemuseus.

Strabismus Concomitans, Convergens, Intermittens. Dr. Wagner.

Monocular, Vertical, Oscillating Nystagmus. Dr. Zehender.

Chronic Spasm of the Eyelids. Dr. Talkow.—This case was treated by section of the supraorbital nerve. The author concludes by saying that the patient, though still complaining of his endless trouble, yet admitted that the neurotomy was of inestimable benefit to him, and would have been of still more, had it not caused loss of sensation in the skin, and pain in the forehead. About a year after, he returned to the hospital with muscular rheumatism of the lower limbs. Besides the muscular pain, there was an unpleasant drawing sensation in the extensors, in the fingers. The blepherospasm had disappeared, the right sphincter alone occasionally contracting. The left supraorbital region has, however, become more sensitive. The case and treatment are of interest to any one who thinks of neurotomy for the pain left in old people after an attack of herpes zoster ophthalmicus.

Astigmatism and Cranial Formation, Dr. Wecker, who reports to the Paris Anthropological Society, July, 1869, that: 1. "The anomalies of refraction, known as astigmatism, stand in direct relation with the formation of the skull, and this holds good in cases besides those where, as Donders said, the anomaly of refraction was excessive. 2. The formation of the eyes and indirectly of the skull determines the written characters." We may thus decide, from the old sculptured letters, the form of the eyes and of the skulls of those who cut them.

Congenital Choroidal Coloboma without Iritic Coloboma. Dr. Talkow.

Acute Conjunctival Œdema. Dr. Zehender.

Xanthelasma Palpebrarum. Dr. Hirschberg and Dr. Talkow.

Post-mortem Examination of an Intraocular Cysticercus. Dr. Sämisch.

Tumor of Back of Orbit, and Nasal Cavity. Dr. Rheindorf.

New Iris Forceps. Dr. Liebreich.

Cancer, starting from the Conjunctiva of the Lid. Gliosarcoma of the Retina. Dr. Hirschberg, with explanatory woodcuts.

Cataplasms in the Treatment of Acute Iritis. Dr. Schiess-Gemuseus, who reintroduces poultices, and says he finds them of great use in treating acute iritis, as also in secondary iritic processes and injuries, or cataract operations.

Ulcus Corneæ Serpens, Dr. Pagenstecher, who has tried with great success Sämisch's proposed method of treatment, by cutting through the corneal ulcer. His success others have not always met with.

Atrophy of the Optic Nerve, following Erysipelas of the Face.—Dr. Pagenstecher reports a curious case.

Subretinal Effusion in the Region of the Macula.—Dr. Betke, who thinks the whitish color left was due to fatty degeneration of the effused blood. Sudden total amaurosis of left eye; complete recovery. Intraocular glioma. Iridocyclitis with great changes in the visual power. Entrance of the whole lens into the anterior chamber after discision, spontaneous absorption without interference. Cataract with fluid vitreous; attempt at extraction, subsequent discision. Complete traumatic amaurosis, total paralysis of all the ocular muscles except the trochlearis, and partial paralysis of this. Purulent periostitis without exophthalmos, subsequent keratitis parenchymatosa. Sclerosis keratitis, iritis, episkleretis. Parenchymatous keratitis, subsequent iritis with corneal opacities from sclerosis. Sclerosis of cornea, partial right, total left; chronic iritis episkleritis. These are all clinical cases sketched by Dr. Schiess-Gemuseus.

Action of Calabar Bean in Diphtheritic Paralysis of Accommodation. Prof. Manz.—He advises his colleagues to try Calabar bean, for he says, although the spontaneous cure of accommodative paralysis may be generally expected, yet even with treatment by good diet, iron, and quinine, or by Jacobson's method by convex glasses, takes weeks or months, while the methodical local application of the bean acts so much more quickly as to entirely recommend it.

Acute Formation of Cataract. Dr. Ritter.—The opacity came on in a lad, aged nineteen, within a week, sufficient to cause the patient to grope about the house. Dr. Ritter suggests whether the lad's occupation, standing at a brick furnace, and exposed to blasts of intense heat, was not the cause. There was no disease of fundus present so far as could be ascertained.

Gummy Tumor of the Conjunctiva of the Bulb. Dr. Estlander speaks of this and other similar cases reported. Iodide of potassium had no effect. He says, as in syphilitic iritis, energetic inunction or other mercurial course is in place.

The Central-venous Retinal Pulse in Epilepsy and Allied Conditions. Drs. Köstl and Niemetschek.—Their observations tend to show that epilepsy is produced by cerebral anæmia, whether this is due to general lack of blood, dilatation of the art. thyreoidea sup., contraction of the carotid, stenosis of the aorta, or lessened contractility of the heart's muscle. The anæmia is seen in the eye by blanching of the papilla. The increased motor activity and psychical exaltation following the anæmic condition, can only be explained by the increased flow of blood to the brain, and thus in the period of reaction there is an increased reddening of the papilla. This reactive hyperæmia is characterized by ectasia of the central vein, greater filling of the optic capillaries, and turgor of the retinal network.

The Blind in the Archduchy of Mecklenburg.—The combined numbers for October, November, and December, of 1870, give an interesting report of some one hundred pages, under the following heads: Official Report of the Number of Blind; Comparison with the Numbers in some other Countries; Deaths; Degree of Blindness; Ages; Causes; Relative Health of the Blind; Occupations; Blind Asylums; Possible Occupations, etc.

Tumors in the Neighborhood of the Eye. Dr. Horner.—These are reports of a series of tumors in the lids, conjunctiva, lachrymal gland, and orbit; of interest, on account of their rarity or course. The microscopic examination was made by Prof. Eberth. Fibroma molluscum of upper lid. Multipled cell, melano-sarcoma of the conjunctiva tarsi. Cancroid of the conjunctiva bulbi at an unusual spot. Fibroma, papillary of the conjunctiva bulbi. Carcinoma of the lachrymal gland. Periosteal fibroma of the orbit. Pigmented cavernous angioma of the orbit. Recurrent myxo-sarcoma of the orbit, metaplasia. Cysticercus in the orbit.

Arrangement of Prisms for the Better Measurement of Lateral Deviation in Insufficiency. Dr. Berlin.—By his arrangement, he holds that we have a limited but a sufficient series of glasses, within the range of which there are no greater sources of error than the method of trial offers. The use is more easy, leaving one hand free, and allows of much quicker measurement.

Neurosis Nervi Optici et Retinæ. Dr. Pagenstecher.—Great anæsthesia of the retina to white light; reflex irritability from opticus and retina, shown by peculiar appearances of color. Contraction of the visual field; spasm of accommodation. Cure by wearing blue glasses, and use of the constant current.

Double Isolated Rupture of the Choroid. Dr. Talkow.—This makes the thirty-second so far reported in ophthalmic literature.

Gunshot-Wound of the Orbit without Injury of the Globe.

Case of Blepharospasm. Prof. Sämisch, of Bonn.—Contributions from ophthalmic practice during the war.

Phantasms during Sleep. Dr. Geissler.—An interesting article, in the closing sentence of which, the author says he cannot regard the phantasms as pathological, since they occur under perfectly regular diet, and absolutely clear mental action and activity. These being so little spoken of, would lead to the idea that they but very unfrequently occurred. This conclusion, however, is doubtful. We may readily convince every one that they have *muscæ volitantes*, and yet few know of their existence. And this very fact deterred Geissler from inquiring among the laity for phantasms. If they are physiological, then, when once recognized, they are with difficulty gotten rid of. This is by no means pleasant. Their artificial reproduction or increase might make among the laity, as with entoptic globules, a confirmed hypochondriac.

Iritic Exudation taking on a Peculiar Form. Dr. Schmidt.

Congenital Defect in the Lens. Dacryo-adenitis with Abscess. Dr. Schiess-Gemuseus.—In the first case there was an absence of one edge of the lens, as if a concave piece had been taken out, about one-fourth of the whole lens. Here the dilated pupil was free of the lens, looking almost like a lateral dislocation.

Glioma of Both Eyes. Dr. Geissler.—A child, six months old. There was atrophy of both optic nerves up above the chiasma. No convulsion or cerebral symptom up to the time of death.

Zehender devotes some twenty pages to analysis of the Transactions of our Society.

Royal London Ophthalmic Hospital Reports. Vol. i., Part 1. February, 1871.

Cases of Temporary Anchyloblepharon. Mr. WORKMAN reports from Mr. BOWMAN'S Practice.—In a case of ectropion he conceived the idea that, if, after releasing the tissues, he were to unite the upper and lower lids for a time, he would obtain a better effect than by simply performing a plastic operation. The result fully realized his anticipations, as the band of union between the two lids prevented, to a great extent, the upper one being drawn up again, while the tissues were cicatrizing at the site of the plastic operation. The success of this proceeding has led to its being adopted in another class of cases—that of palsy of the seventh nerve, where the patient is unable to close the eye, which, in consequence, suffers from constant exposure. Here, too, the result has been very satisfactory. Mr. Bowman cautions, in this operation of uniting the eyelids for a temporary object, care must be taken not to interfere with the subsequent integrity of the tissues at the tarsal margin. If delicately done, it will be found sufficient to shave off a very thin slice of the opposed margins along the line of the Meibomian orifices, not including that of the cilia. Very fine threads should be used, and should extend beyond the bare surfaces, and take a good hold of the edge of the lid, so as not to cut themselves out. They should be removed on the fifth to the eighth day.

Lead Poisoning as a Cause of Optic Neuritis. Mr. HUTCHINSON.—Three good ophthalmoscopic pictures explain what he means and what he has seen, and to these, with the cases reported, we would refer our readers.

Punctured Wound of the Sclerotic, with Escape of Vitreous, treated by closing the Wound with a Suture. Mr. LAWSON.—He found that, if the sclerotic wound be closed by a single fine suture, and the escape of the vitreous be arrested, union of the cut edges will rapidly follow. The suture should be of the finest silk, and to each end of it a needle should be fastened, so as to allow of the silk being drawn through each edge of the wound separately, and from *within* outward.

Case of Sympathetic Retinitis Pigmentosa. D. A. Robertson.—This he believed to be a true example of sympathetic ophthalmia, although the character of the inflammation differed from that which we usually observe resulting from sympathetic irritation; for while this disease is usually characterized by plastic inflammation of the iris, extending back to the ciliary processes and choroid, this had as its chief feature retinal inflammation with pigmentary deposit.

The Treatment of Sämisch's "Ulcus Corneæ Serpens." Dr. Pagenstecher.—He has tried this slitting through of the ulcer twelve times, and with almost unexceptional success. He deduces—1. That the ulceration on the cornea is arrested in its progress, and retained within its already acquired limits. The clouding of the cornea, so inimical to the sight, is thus reduced to the utmost possible minimum. 2. The base of the ulcer is cleansed, and becomes more transparent, and the existing infiltration, limited to one side, disappears totally after a few days. In one instance he noticed this to have taken place at the end of twenty-four hours, in another at the end of thirty-six hours. 3. Hypopyon, when such existed, or the particles clouding the aqueous humor were, to a very great extent, at the time of the operation, emptied out, and the absorption of such particles as remained behind was much accelerated. Hereby one danger, frequently unavoidable under other modes of treatment, is obviated—the organization of these elements; and the closing of the pupil thereby often occasioned, or its adhesion to the anterior capsule, is much diminished. 4. The irritation of the iris decreases rapidly; and in cases submitted to treatment at an early period, a very favorable mydriasis is seen soon to set in. 5. Ciliary neuralgia, when present, is completely allayed—if not immediately, within a few hours.

We would strongly recommend a perusal of this article of Dr. Pagenstecher to any one intending using Sämisch's method of treatment.

A Case of Amaurosis after Erysipelas. Mr. Hutchinson.—This very interesting case he prints in connection with two cases of

Atrophy of the Optic Nerve after Erysipelas of the Face, Dr. Pagenstecher, observed at the ophthalmic institution at Wiesbaden.

Miscellaneous Cases and Observations. Mr. Hutchinson.

Albinism (incomplete). Divergence and oscillation of the globes.

Albinism in a brother and sister. Defective vision and oscillation of globes in both. Hypermetropia.

Artificial eyes worn by young children (three years of age).

Failure of sight during lactation, and its meaning as a symptom.

Loss of accommodation from nervous shock.

Pyramidal cataract after purulent ophthalmia, but in one eye only.

Myosis and irido-plegia from brain-disease. Autopsy.

On the occasional intractable character of pustular ophthalmia.

Pyramidal cataract in one eye only, with corneal opacity.

Mydriasis and cataract in infancy in connection with syphilis. Subsequent dislocation of the lens into the vitreous. Excision of the globe.

Acute abscess in the lachrymal gland. Good recovery after incision.

Retinitis pigmentosa. Chronic rheumatic arthritis.

Case of congenital cataracts, with myopia and deafness.

Symmetrical ptosis in a child after purulent ophthalmia. Operation.

Case of extreme myopia. $V=\frac{20}{70}$ with $-\frac{1}{2}$.

Neuro-retinitis in connection with albuminuria and disease of the heart.

Atrophy of left optic disk, and deafness on the same side, after a severe blow on the head, which was attended for a time with hemiplegia.

Hereditary syphilis; severe ulcerations since childhood; characteristic teeth.

Keratitis; rapid improvement under iodide of potassium.

Giornale d'Oftalmologia Italiano. (Continued from our last year's Report, through the numbers for 1870, all so far received.)

Three Cases of Penetrating Wound of the Eye from Percussion Caps. Prof. Businelli.—These well support the hope, in which we join, that the professor closes with, namely, that some law might prevent the sale of the poorer qualities of percussion caps, and that, in the perfection of fire-arms, these may be quite done away with. *Quod est in votis.*

Under what Circumstances the abuse of smoking Tobacco and drinking Alcohol produces Amaurosis. Dr. Reymond.—He would treat cases much more actively than the mere abstinence from tobacco or stimulants. He uses also paracentesis of the aqueous chamber.

Cysticercus in the Vitreous. Dr. Marini.—He decided it was a cysticercus tenuicollis of Rudolph.

Some Cases of Syphilitic Ophthalmic Disease cured by the Hypodermic Injection of Calomel. Prof. Quaglino.—Of special interest to the student of syphilography.

Removal of Capsule and Lens together in Cataract..—Prof. Gioppi continues his report on this, together with correspondence on the same from his Italian colleagues.

Prof. Cesare Paoli published in the "Sperimentale" accounts of the bad effects of petroleum-light on the eyes, and in the Italian Journal of Ophthalmology Drs. Calderini and Reymond publish two articles on protective glasses against the chemical rays in gas and petroleum lights.

Hemeralopia in a Woman operated on for Cataract, appearing spontaneously with the Effect of Sunlight. Dr. Reymond.—This was an interesting case, showing that hemeralopia may be developed by other causes. Clinically it was shown that it was here due to the existence of minute blind points in the centre of the retina.

Quinine as a Topical Application in Affections of the Eyes.—Dr. Flarer follows Nagel's suggestions made at the Heidelberg Congress in September, 1869.

Lachrymal Fistula cured in Eighteen Days by Destruction of the Sac, with some Considerations on the Conditions in which Caustic is applicable. Dr. T. Frassati.

The Principles governing Inflammations of the Eye. Dr. Rosmini.—This is the first portion of quite an extended article not yet finished.

Interpretation of Hemeralopia Aphorisms. Dr. Reymond.

Electricity in Granular Conjunctivitis. Dr. Rodolfo.

Besides the articles enumerated, the Italian Journal of Opthalmology keeps its readers apprised of what is going on, by analysis of all the other ophthalmic journals published in English, French, and German.

Report of the Medical Society of Steirmark. 1869–'70.

Dislocation of the lens; exhibition of a patient. Dr. Blodig.

Case of *carcinoma medull. bulbi* removed; patient exhibited. Dr. Keller.

Three cases of prolapse of the iris exhibited by Dr. Keller.

Treatment of acute ophthalmia blennorhagica. Dr. Ninaus.

Annali di Ottalmologia. Under direction of Prof. A. Quaglino.—This is a new Italian ophthalmic journal commenced this year, 1871, and published at Milan. The first number contains the following:

Some forms of intermittent ocular affections. Prof. Quaglino.—This has been pretty completely translated in the Annales d'Oculistique, vol. i., for 1871, p. 119.

Contribution to the Clinical History of Ocular Tumors. Prof. Quaglino.—These are: 1. White sarcoma of the choroid; 2. Detachment of the retina, followed by cataract, consecutive symptoms of glaucoma with rebellious periorbital neuralgia, enucleation, melanotic sarcoma of the choroid; 3. Squint and paralytic diplopia; consecutive atrophy of the papilla, with amaurosis and mydriasis; exophthalmos, enucleation of the globe, and extirpation of the tumor; myxoma of the optic nerve.

Molluscum Contagiosum. Drs. Bizzozero and Manfredi.

Experimental Studies of Inflammation of the Lens. Dr. Forlanini.—He gives only the results of his researches hereafter to be published in detail. He holds that a suppuration of the true fibres of the crystalline is possible.

Development of Optic Neuritis in Cerebral Affections. Dr. Flarer.—Dr. Forlanini follows this with his observations and experience *à propos* to Dr. Flarer's memoir on optic neuritis.

Formation of Bone in the Eye. Dr. Knapp. *New York Medical Journal*, February, 1871.—He, from observation of several cases, concludes that the origin of true bone in the eye may always be traced to plastic inflammation of the capillary layer of the choroid. Calcification may occur, and has been observed in every tissue of the eye, but ossification only in connection with the vascular chorio-capillaris. The nature of the ossific process in the eye is the same as that in connective tissue generally, the same as in the formation of bone from periosteum. The cells (white blood-corpuscles) and intercellular substance are poured out, the former in some places densely crowded; and then, with a clear line of demarcation, the infiltration with chalk begins. In some portions, the connective-tissue corpuscles are still preserved round, or nearly so, having few offsets; but the more the chalky infiltration advances, the more numerous the offsets become, communicating with each other to form the canaliculi. The round, movable, lymphoid cell, putting forth its processes and retracting them again, becomes, first, the jagged cell of the osteoid tissue; and, finally, the stellate cell—the real bone-corpuscle.

Contributions to Ophthalmic Therapeutics.—On the period of operating in Senile Cataract. R. B. Carter. Practitioner, March, 1871.

I cannot resist quoting his closing remarks in speaking of Graefe's new cataract-operation: "Besides influencing our judgment about the time for the performance of extraction, the new operation has greatly taken from the importance of several conditions that used to be regarded as almost prohibiting interference. In the days of flap-extraction, cough was a great bugbear, and frequently caused prolapse of the iris into the wound. Now that the piece of iris opposite the wound is excised, no such prolapse can take place, and cough is comparatively, perhaps absolutely, harmless. In the same way conditions requiring frequent recourse to an upright posture, such as asthma or irritability of the bladder, have very little influence upon the small section. Chloroform, which was shunned by many in flap-extraction for fear of the straining of sickness, may also be administered with good effect, and protracted confinement to bed is no longer necessary. It follows that many of the fears and precautions with which cataract-extraction was once properly surrounded, may now be regarded as belonging to the past, and that they should be suffered to go the way of the circumstances in which they took their origin. Surgery can boast of few greater triumphs than the modern improvements in cataract-extraction; and these improvements have been brought about in the only right and sound way, by careful study of all the sources of failure in the old operation. It is now time that the public should enter upon the full fruition of the benefits that have been thus obtained for them."

Return of Vision after Atrophy of Optic Papilla. Dr. R. P. Oglesby. *Dublin Quarterly*, 1870. See also his previous publications in *Lancet*, August 22, 1868; Royal London Ophthalmic Hospital Reports, April, 1869.—He makes three periods in the process of recovery, to the third of which he would call special attention: 1. If the patient does not distinguish colors with a certain degree of assurance, it is rare that vision becomes reëstablished to any great degree. 2. If color-perception is pretty good, the patient may recover, most probably, a degree of vision that will enable him to go about alone, or do some coarse work. 3. If the patient distinguishes colors readily and with facility, entire recovery of sight is probable.

Leipsic Ophthalmic Dispensary. Its first five-years' report from Drs. Coccius and Wilhelmi.—We wish all ophthalmic hospitals and infirmaries would give us like experience of what has and is being done within their walls. We quote only what they say as to Graefe's peripheric linear cataract-operation: 1. Removing the cut from the cornea to the neighboring sclerotic tissue greatly lessens the danger of corneal sloughing, and thereby improves the chances of success. 2. In an eye without the lens, an iridectomy downward, if not too large, does not materially affect the visual perception as compared with a sound pupil. 3. A comparative glance at the two series of operations they report would incline them to trust most to a *preparatory* iridectomy rather than a contemporaneous one. In 127 cases, they lost but *two* from suppuration of the cornea, which they say is decidedly better than the results with the corneal flap-operation.

De l'Ophthalmie névro-paralytique. Dr. J. B. Coppez.—This name he gives to the group of changes that take place in the eye after section, paralysis, or irritation of the fifth pair of nerves. To be more precise, the ocular lesions are due not to an absence of the nervous influence, as the term "névro-paralytique" might imply, but to an irritating agent acting exteriorly on the anatomical elements of the cornea, or interiorly on the nerve itself, and thus, by means of the nutritive and formative irritation, an exaggerated cell-proliferation. He admits this last mode of action is denied by the majority of physiologists, who cannot produce it experimentally. But surgical pathology, in advance of experimentation, must needs admit the direct influence of the nervous system on nutritive phenomena, from the evidence of numerous and tested facts which careful observation daily accumulates. To the essay itself we would refer for proof of the above.

The Ophthalmic Phantom and the Ophthalmoscope as an Optometer. Dr. Franz Mohr. Wurzburg, 1870.—He recommends his apparatus to all interested in ophthalmoscopy, examination with the upright image, and optometry, convinced that it will greatly assist students and teachers in ophthalmoscopy, and enable them to employ Jäger's pictures where the living eye cannot be used for teaching or demonstrating.

Étude sur l'Iridectomie. Dr. Pomier. Paris, 1870.—He gives the diseases in which the operation is applicable and how it is to be carried out—as an optical effect, for prophylactic reasons, as an antiphlogistic, and still more, *in extenso*, its use in Graefe's peripheric linear operation for cataract. A *résumé* is in *Zehender's Journal*, May, 1870, page 156.

Ueber die therapeutische Wirkung des Atropin auf myopische Augen. Dr. Wosch. Basel, 1871.—An inaugural dissertation before the medical faculty of Basle. The author concludes that atropine is the only known remedy which, in a certain class of cases, produces a decided effect, namely, a pushing off of the far-point; in others, renders stationary a process which is otherwise progressive, not only according to Donders's statement, but in accordance, also, with the experience of all scientific physicians. His method of employing atropine has the additional value of showing the patients and those around them that the accommodative efforts are what increase the myopia, and this often very rapidily. Thus they will be induced to avoid such hurtful influences, and so much is already gained. His plan also is devoid of danger when the eyes are properly protected against too great light.

Aside from the therapeutic value, the use of atropine is of worth in the pathological physiology of the eye. It proves that, in the large majority of cases, the myopia is the result of two components. Their relative value depends on the duration and amount of the myopia. The longer this has lasted and the larger it is, the greater is the import of the axial elongation compared to the cramp. The more recent the myopia, the more is it to be laid to the cramp. His experience would indorse this, namely, that atropine acts persistently only in young people, while in older myopes this does not hold. He considers his results of etiological value also. Donders was inclined to consider that there was in every case of myopia a congenital, generally hereditary predisposition, and he rejects totally a primary cramp of the muscles of accommodation. Of the author's patients, mostly of the educated classes, the majority denied having been previously myopic, and myopia could but seldom be traced to other members of the family. Of the cases, he holds, moreover, a majority were purely and simply acquired by constant accommodative effort. His results are only explainable by accommodative cramp, which, having commenced, caused, by long continuance, axial elongation. This last seems proved by the fact that in those cases where atropine removed only a portion of the myopia, this, therefore, being dependent both on cramp and axial elongation, the myopia began first to show itself at the time when accommodative effort was imperative.

Several new or newly-edited hand-books or compendiums have appeared, since my last report, to be here mentioned. This is not the place to criticise them, as the journal-reviewers take care of that much better. Schauenberg sends out the fifth edition of his "Ophthalmiatrik," with 40 woodcuts, a volume of 350 pages. Rheindorf gives us the second edition of his "Handbuch der Augenheilkunde," with 23 cuts and 238 pages. Ignatz Meyer publishes the third edition of his "Compendium der Augenheilkunde," with 16 cuts and 358 pages. Schelske offers the first part, 202 pages, of a "Lehrbuch der Augenheilkunde." Schweigger, who has taken Graefe's place, has written a "Handbuch der speciellen Augenheilkunde," with 43 cuts and 538 pages. Tetzer's "Compendium der Augenheilkunde" has been issued by Dr. Grünfeld, with three lithographic plates and 488 pages. Klaunig has edited a "Compendium der Augenheilkunde," of 300 pages, dated Leipzig, 1872.

German students and practitioners at least seem, therefore, to be well looked after in the matter of hand-books. Mr. Soelberg Wells keeps his "Treatise on Diseases of the Eye" up to the times, and we would again recommend it as the best book for the English or American student or practitioner.

Books, Monographs, and Journal Articles not noticed in the Report.

Das Auge und der Blick. W. Henke. Rostock, 1871.

Recovery from Double Optic Neuritis. Haynes Walton. Med. Times and Gazette, August 6, 1870.

Sympathetic Ophthalmia. Dr. T. R. Pooley. New York Med. Journal, October, 1870.

Anterior Epithelium of the Cornea. W. Krause, Reichert in Du Bois-Reymond's Archiv, July, 1870.

Ciliary Muscle. D. Wende. Ditto.

Lymph-Spaces in the Eyeball. G. Schwalbe. Schultze's Archiv, 1870. pp. 1–261.

Parts concerned in Accommodation. J. W. Hulke. Quarterly Microscopical Journal, October, 1870.

Circulation in the Eye. Dobrowolsky. Centralblatt, 1870. pp. 305.

Papers on Accommodation by Adamük. Centralblatt, 292, and Woinow, reviewed in Centralblatt, 478.

On Movement of the Iris. By Engelhardt. Würzburg, Untersuchungen iv., 296.

On Intermittent Irritation of the Retina. Pflüger's Archiv, iv., 214.

Parenchymatous Keratitis, associated with Acute Rheumatism. Spencer Watson. Lancet, October 22, 1870.

Traumatic Paralysis of the Visual Accommodation. Geo. C. Harlan, M. D., American Medical Journal, January, 1871.

Does Disease of the Cerebellum lead to Loss of Sight? British Medical Journal, October 14, 1870.

Parenchymatous Keratitis associated with Acute Rheumatism. Mr. Spencer Watson. British Medical Journal, October 22, 1870.

An inquiry into the Causes of the Occasional Failure of the Operation for Squint. Mr. Spencer Watson. Practitioner, January, 1871.

Injury to the Ciliary Nerves by a Blow. Mr. B. Carter. Lancet, December 3, 1870.

Three Cases of optic Neuritis. Mr. B. Carter. Lancet. November 5, 1870.

Zur Aetiologie und Prophylaxis der Myopie. Dr. Kämpf. Allgemeine Wiener Zeitung, Nos. 2–3, 1871.

The Ophthalmoscope in the Treatment of Epilepsy. R. A. Vance, M. D. New York Medical Journal, February, 1871.

Remarks on Divergent Strabismus. By Ed. G. Loring, M. D. American Medical Journal, April, 1871.

Account of a Severe Ophthalmia caused by Exposure to the Intense Light reflected from a Dazzling Surface of Snow. W. H. Gardner, M. D., U. S. A. American Medical Journal, April, 1871.

Paralysis of the Ciliary Muscle from Diphtheria. J. Hutchinson. Lancet, January 7, 1871.

Nævus of Orbit, Excision, Recovery. Mr. S. Lawson. Lancet, January 28, 1871.

Death by Chloroform during Enucleation. Mr. Power, Lancet, January 28, 1871.

Ueber die Ursachen des nicht selten vorkommenden Misserfolges der Operationen für Strabismus. Dr. S. Watson. Wiener Medizinische Zeitung, 10–11, 1871.

On the Color of the Eyes of the Newly-born. Dr. A. Wiltshire. Lancet, February 11, 1871.

A Very Rare Form of Strabismus and Astigmatism. Dr. Partridge. Medical Times and Gazette, March 4, 1871.

Opthalmoscopische Zeichen des Todes. F. Poncet. Allgemeine Wiener Zeitung, No. 2, February, 1871.

Albuminuric Retinitis. Dr. A. Robertson. Edin. Med. Jour., January, 1871.

Case of Renal Retinitis with Peculiar History as to Scarlet Fever. Lancet, April 8, 1871.

A New Operation for Entropium. J. McGraith. Medical Times and Gazette, March 25, 1871.

Retinitis pigmentosa in Two Brothers, the Offspring of a Marriage of Consanguinity. Rare Form of Vertical Nystagmus. S. Wells. Lancet, May 6, 1871.

Influence of the Sympathetic Nerve upon the Eye. Dr. Sinitzin. Centralblatt.

On the Various Operations for Lachrymal Obstructions and Tumors. Dr. A. Sichel. Bulletin générale de Thérapie, April and May, 1870.

Astigmatism as connected with the Form of the Cranial Bones Dr. Wecker. Gazette Médicale de Paris.

Antagonism of the Alkaloid of the Calabar Bean and Atropine. Recueil des Memoires de Médecine, de Chirurgie, et de Pharmacie militaire.

Causes of Myopia, its Frequency, and its Influence on Military Service. Gazette Hebdomadaire, Revue des Cours scientif., Sep., 1870.

Retinitis leucæmica. Dr. Becker. Gazette des Hôpitaux.

Diabetic Cataract. Ditto, ditto.

Alcoholic Amblyopia. Dr. Daguenet. Union Méd., 1870, No. 47.

Calomel in Ophthalmia. Ditto.

Effects of Abuse of Tobacco on the Eyes. Dr. Blatin. Bull. Gén. de Thér.

New Plastic Operation on the Lids. Dr. Gradenigo. Gazz. Med. Ital. Prov. Sarde.

Cure of a Case of Separation of the Retina by Puncture. Prof. Secondi. Nuova Liguria Medica.

Periphery of Descemet's Tunic and its Influence on Accommodation. Dr. Heiberg. Nordishk medicinskt Archiv, Bd. 2, No. 11.

Retinal Hæmorrhage foreboding Fatal Apoplexy. Dr. Berthold. Berl. klin. Wochenschrift, No. 39, Sept., 1869.

Investigations into the Lymphatics of the Eye and their Distribution. Dr. G. Schwalbe. Archiv für Mikroskopische Anatomie, Bd. 6.

De canali Peteti et de Zonula ciliari. Schwalbe. 1870.

Ueber die Nerven der Conjunctiva und Sclera. Helferich. Würzburg, 1870.

Musculus dilatator pupillæ in Man, Mammals, and Birds. J. Dogiel. Archiv f. Mikroscop. Anat., Bd. 6.

Phosphene besonderer Art. Dr. Szokalski. Zehender's k. Mon., p. 146. 1870.

Teleangiectasie palpebræ inferioris. Dr. Dobrzycki. Ditto, p. 147.

Wirkung der Calabarbohne bei Annomalien der Accommodation. Dr. Talkow. Ditto, p. 148.

Retinitis leukæmica. Dr. Roth. Virchow's Archiv, Band 49, pp. 441–446.

Behandlung der Conjunctival-Leiden mit Plumbum Aceticum. Dr. Schmidt. Berlin. klin. Wochenschr., No. 2, January 10, 1870.

Bijdrage tot de Behandling van sommige Gebreken der Oogleden. Inaug. Diss. Van Gil's. Utrecht, 1870.

Rendiconto della Divisione ottalmica dell' Ospedale di Pavia, 1868–69. Dr. G. Flarer. Milano, 1870.

Ueber die Grösse des ophthalmoskopischen Bildes. Dr. Schweigger.

Grundsubstanz und Zellen der Hornhaut des Auges. Schweigger-Seidel. Zehender. 1870, p. 175.

Aneurism in Sinus Cavernosus, with Paralysis of Third, Fourth, Fifth, and Sixth Cerebral Nerves. J. Adams. New Orleans Med. Jour., April 1870.

Conjunctivitis granulosa. Dr. Sämisch. Zehender, 1870, p. 181.

Melanosarcoma of Ciliary pressing into Anterior Chamber. Dr. Wells. Lancet, January 20, 1870.

Ueber Erweiterung des Thränen-Nasencanals bei Lungenkranken. Dr. Starke. Deutsch. Archiv f. klin. Med., 7. 2, pp. 212–217.

Morbus Brightii, chronic, with Retinitis. Memorabilien, Jahr 15. May 25, 1870.

Sudden transitory Blindness in an Adult aged eighteen. Zehender, 1870, p. 263.

Practical Suggestions for the Treatment of Lachrymal Diseases. C. R. Agnew. Am. Practitioner, January, 1871.

Cavernous Tumor of Orbit, Removal without Injury to Globe or Optic Nerve. Dr. E. L. Holmes. Chicago, Med. Jour., 1871.

Connection of Ocular Muscular Activity with Scoliosis. Dr. Ellinger. Wien. med. Wochenschrift, June 25, 1870.

Miseries of Myopes. Medical Times and Gazette, September 3, 1870.

Strychnin als Heilmittel bei Amaurosen. A. Nagel. Centralblatt für die medizinischen Wissenschaften, 55, 1870.

Our Eyes and how to take care of them. Dr. H. W. Williams. Boston.

Heilung einer durch Schussverletzung verursachten Amaurose mittelst Strychnininjectionen. A. Nagel. Berl. klin. Woch., 6, 1871.

Beitrag zur Lehre von der Choroiditis disseminata. Inaug. Diss. H. Fitzer, 1870.

Urœmische Amaurosen. H. Schmidt. Sep. Abdr. Berl. klin. Woch., 48. 1870.

De vulneribus oculi, etc. A. Coccius. Lipsiæ, 1870.

Albuminuric Retinitis. A. Robertson. Edinburgh, 1871.

Wirkung des Atropin auf myopische Augen. F. Hosch. Basel, 1871.

Melano-Carcinoma polyposum præconeale. Hirschberg. Aus Virchow's Archiv.

Conjunctivitis Diphtheritica. Hirschberg. Berl. klin. Woch., No. 4, 1871.

Neubildung des Hornhautepithels. Heiburg. Zehender, 1871, p. 116.

Observations on the Hygiene of Vision. Dr. R. B. Carter. Practitioner, 1871.

Objectif à Prismes pour l'Usage d'une Ophthalmoscope démonstratif. Wecker et G. Roger. Annales d'Oculistique. Vol. i., 1870, p. 286.

Nouvel Ophthalmoscope de M. Javal. Ditto, p. 287.

Nouvelle Pince pour la Pupille Artificielle. Liebreich. Ditto, p. 287.

Die Augendiätetik, oder die Kunst das Sehvermögen zu erhalten and zu verbessern. Dr. F. Ch. Jüngken. Berlin, 1870.

Ueber eine neue Art Stereoskopischer Wahrnehmung. J. B. Listing. K. Gesellsch. d. Wissensch. zu Göttingen, 1869, No. 17, pp. 431–455.

Ophthalmic Symptoms in Spinal Affections. Dr. A. Robertson. Edin. Med. Journ., 1870.

Moyens de Constatation de l'Amblyopie ou de l'Amaurose d'un Œil. Cuiguet. Annales, vol. ii., 1870, p. 68.

Extraction linéaire périphérique. Incision au moyen du couteau de Weber. Giraud-Teulon. Ditto, p. 60.

Exposé des différentes Méthodes de Traitement du Larmoiement, de la Tumeur et de la Fistule Lacrymales, et des Obstructions du Canal Nasal. A. Siebel. Ditto, p. 73.

Kyste d'un des Conduits Excréteurs de la Glande Lacrymale. Dubrueil. Ditto, p. 75.

Les Mouvements de l'Œil éclairés à l'Aide du Phénophthalmotrope. Donders. Ditto, p. 77.

De la Loi de Rotation du Globe Oculaire dans les Mouvements associés des Yeux. Helmholz. Ditto, p. 77.

Gliome ascendant de la Rétine, suivi de Mort. Arcoleo. Ditto, p. 77.

Klinische Erfahrungen und Studien im Zeitraume der Jahre 1867–'69. Steffan. Ditto, p. 86.

Traité des Maladies des Yeux. Galezowski. Paris, 1870, Part 1.

Diphtheritic Conjunctivitis, a Case of, Dr. Robertson. Edin. Med. Journ. 1870.

Coexistence d'Altérations Anévrysmales dans la Rétine avec des anévrysmes des petites artères dans l'Encéphale. Dr. Lionville. Annales d'Oculistique, vol. ii., 1870, p. 169.

Asthénopie par Spasme des Muscles Accommodateurs. Fano. Ditto, p. 172.

Sur la Structure de la Portion Ciliare de la Rétine. Manfredi. Ditto, p. 173.

Quelques Formes Rares de Maladies Oculaires. Gradenigo. Ditto, p. 174.

Der Markschwamm der Netzhaut. Hirschberg. Ditto, p. 267.

Troubles de la Vision dans la Leucocythémie. Penin. Ditto, vol. i., 1871, p. 69.

Operation de l'Entropion. Durand. Ditto, ditto.

Nouvelles Expériences sur l'Influence du Sympathetique et du Trijumeau, sur la Pression et la Filtration oculaires. Dr. Adamük. Ditto, p. 77.

Diseases of the Eye; attached to Holmes's Surgery. Dr. Dixon, p. 256.

Traité des Maladies du Fond de l'Œil et Atlas d'Ophthalmoscopie. Wecker et Jäger. 1870. Prix 35 francs.

Color Blindness. Dr. R. Derby. New York Med. Jour., March, 1871.

Modern Operation for Cataract. Dr. H. Derby. 1871. Boston Med. and Surg. Journal.

Hémorrhagies rétiniennes. D. E. Larrien. Paris, 1870, pp. 112.

Ueber Corelyse. Dr. A. Reuss. Wiener Med. Presse, No. 47, 1870.

Ueber Tätowirung der Cornea. Ditto.

Zwei Fälle von Sarkoma der Orbita. Dr. E. Emmert. Berlin, 1870.

Ein neues Exophthalmometer. Ditto.

Second Report Brooklyn Eye and Ear Hospital. January, 1871.

La Igiene degli Occhi. Dr. Monte. Napoli, 1870.

Hydrophthalmus congenitus. Inaug. Diss., Dr. Muralt. Zürich, 1869.

Ophthalmia militaris sive granulosa. Dr. M. Peltzer. Berlin, 1870.

Ein Wort der Erinnerung an Albrecht von Graefe. Prof. A. Graefe. Halle, 1870.

Albrecht von Graefe. Dr. A. Göschen. Berlin, 1870.

Was verdankt die Menschheit Albrecht von Graefe. Dr. H. Cohn. Breslau, 1871.

Das Auge und seine Pflege im gesunden und kranken Zustande. Dr. F. N. Heymann. Leipzig, 1870.

Diagnosis of Intraocular Sarcoma. Dr. Becker. Am. Med. Journal, July, 1871.

Loss of Accommodation from Nervous Shock. Hutchinson. Ditto. p. 280.

Failure of Sight during Lactation and its Meaning as a Symptom. Ditto, ditto.

Du Décollement de l'Hyaloide. Dr. Fr. Vacca. Rivista Clinica, 1870, fasc. 72.

Notes sur les Tumeurs de l'Orbite et principalement sur le Myxôme du Nerf Optique. Dr. A. Sichel. Gaz. hebdom., 8–9, 1871.

Études sur les Amblyopies et les Amauroses Syphilitiques. Dr. X. Gelezowsky. Arch. Génér. de Médecine, Jan., Fev., 1871.

De l'Extracture de la Cataracte. Dr. Droguet-Landré. Annales, 1871, p. 288.

Pathologie iconographique de Fond de l'Œil. A. de Mortema. Paris, 1870.

Atlas d'Ophthalmoscopie et d'Optomètrie. M. Perrin. Paris, 1870.

Atlas d'Ophthalmoscopie. R. Liebreich. Seconde édition. Paris, 1870.

Ueber das Verhalten der Doppelbilder bei Augenmuskel-Lähmungen. Dr. M. Woinow. Wien, 1870.

The Eye in Health and Disease. Dr. B. Joy Jeffries. Boston, 1871.

AN APPARATUS FOR CUTTING MICROSCOPIC SECTIONS OF EYES. By Edward Curtis, M. D., of New York.

So-called "section-cutters," or "microtomes," of various kinds, have long been used by working microscopists for cutting thin sections of substances intended for microscopical examination. The advantage of these instruments is, that by their use more extensive sections can be obtained, and that too with greater certainty, and less waste of material than by the usual method of cutting by hand. Hence, the special occasions when a section-cutter comes into play are the following: First, when it is desired to get an unbroken section of considerable extent to show the mutual relations of comparatively distant parts; secondly, when a number of sections are wanted from a scanty amount of valuable material; and thirdly, when, as may be the case for various reasons, it is desired to cut into available sections the whole of a given area of tissue.

Now, all three of these considerations often peculiarly obtain in the microscopic examination of morbid eyes. For, in the first place, when we remember the complex structure of the eye, and the close physiological connection in it of anatomically dissimilar parts, it is plain that the study of regional pathology is often of the greatest importance, as in cases of tumor, or traumatic lesions. And, in such cases, the advantage of having extensive microscopical sections, that will show all the tissues of a diseased region *in situ*, is obvious. In the second place, the number of similar sections that can be cut through any part of special interest in a morbid eye is, of course, small, so that, if duplicates are wanted, there is no material to waste. Thirdly, many lesions of the eye are so minute and scattered, that, to be sure of getting sections that pass through them, it is often necessary to cut the whole of a given area into sections, and examine these seriatim.

To secure these advantages, I have been at some pains to obtain an apparatus that should enable me if possible to cut sections, when needed, of an entire eye. None of the section-cutters supplied by dealers being of the right size to hold a whole eye, I had one made large enough to do so, and to this I have added various accessories, so that the whole forms practically a new piece of apparatus, which, from its successful working, I have thought worth describing. The apparatus is shown in the accompanying woodcut. It consists of the part *A* (Fig. 1), for holding the object to be cut, modelled after a form of section-cutter in common use; and of the cutting part *B*, after my own device, composed of a long straight knife held in a frame. The holder, *A*, consists of a heavy brass plate, faced with glass, six inches long by three and three-quarters wide, from the centre of which is sunk a hollow cylindrical barrel, one inch and three-quarters in depth, and one inch and one-quarter in diameter, inside measurement. Through the bottom piece of this barrel (which unscrews for convenience) works a screw-shaft, fur-

FIG. I

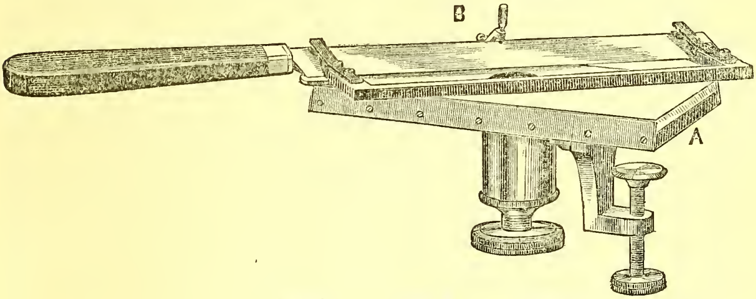


FIG II

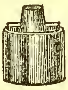


FIG III

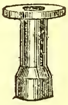


FIG IV

nished with a large milled head. The threads of the screw are fifty to the inch, and the circumference of the milled head is marked off into eighths, so that, if desired, the thickness of the sections cut can be measured. Attached to the under surface of the face-plate, near one end, is a screw clamp for fastening the apparatus to the edge of a table, so as to leave both hands of the operator at liberty to work the cutter. The principle of this "holder," as it might be called, is very simple. The object to be cut is first embedded in a cast of wax and oil, or paraffine, made to exactly fit the bore of the barrel; this mass is then pressed into the barrel, pushed upward by turning the milled head of the screw-shaft until it projects slightly above the level of the face-plate, when the projecting part is cut off by a sweep of the knife. Another turn, or fraction of a turn, of the milled head is then made, and again the projecting portion is cut off, this time as a smooth, even section of microscopic thinness. For a cutter, I had a straight knife made with a blade eight inches long, one and a quarter inch wide, and three-twentieths of an inch thick at the back, and with the sides concave like a razor. This I at first used by itself, sweeping it over the surface of the holder in cutting the sections, but I found that, from the length and thinness of the blade, it was apt to bend under pressure, and so fail to cut an even section, and also that the edge soon got dull from friction upon the face-plate. To obviate these difficulties, I conceived the idea of having the knife fixed in a frame, which should answer the double purpose of holding the blade stiff, and carrying it with the edge raised slightly above the level of the surface of the holder, so that the under surface of the arms of the frame should be the bearing surface upon the holder, and the edge of the knife be allowed to touch nothing but the tissue to be cut. The design of the frame will be seen at once from the figure; it is made of brass, and the knife is pushed into place from behind, under a couple of springs, which hold the blade down, and, when pressed home, the knife is kept from slipping back by a little fastening which is pushed against the back of the blade and then fixed by a turn of a quick screw. Besides the advantages of the frame in holding the knife stiff, and keeping its edge from scraping over the surface of the holder, its weight and broad tread make its sweep much more steady and true than that of a light knife used by itself.

Such is, in brief, the mechanism of the apparatus, and I may remark, as proof of its efficiency, that I can often cut with it sections of an entire human eye, thin enough for microscopical examination. In preparing the tissue and cutting the sections, however, there are one or two points which it is necessary to observe in order to get the best results. To make these clear, it is, perhaps, best to detail the whole process of manipulation, although this is essentially the one in common use in preparing sections for examination in oil of cloves, or mounting in balsam or varnish. Supposing the object to be a morbid eye, this must, *immediately* after enucleation, be put into Müller's fluid,[1] and there left for at least three weeks. It is then cut open with a sharp knife or razor, and the halves soaked in water to remove the bichromate. This will take one or two days, the water being often changed. Such portion as is intended for cutting in the section-cutter is then to be further hardened in alcohol. In doing this I prefer to put it first into alcohol and water, half and half, for a couple of days; then into alcohol of full strength for an equal time, and then into absolute alcohol. In this last fluid the piece stays until hard enough to cut; the time required varies with different specimens, but is generally, with eyes, at least several weeks, as a very thorough hardening is necessary when the section-cutter is to be used. When ready for cutting, the piece is transferred to oil of cloves,[2] where it is allowed to stay until thoroughly impregnated with the oil: this takes from half an hour to several hours, according to the size and solidity of the specimen. The piece, however, must not be left indefinitely in the oil, as this slowly stains tissues an indelible dingy yellow, increases their index of refraction, so that the sections will look semi-opaque, even in Canada balsam, and may ultimately even spoil them for microscopical examination. When thoroughly soaked in oil of cloves, the piece is to be embedded for cutting. For this purpose two menstrua have been principally used, a mixture of white wax and olive-oil, in about equal proportions, and paraffine. I had been in the habit of using the former, although it has many disadvantages, having found paraffine, though in other respects preferable, too hard and brittle to cut well. My friend Dr. William Thomson, of Philadelphia, however, lately told me that he got excellent results from paraffine thinned with kerosene, its natural solvent. This I have tried, and have also used oil of turpentine and benzine for the diluent, and from what experience I have had I am now disposed to prefer thinned paraffine to wax and oil. Its most important advantage is that, so far as my experience goes, an accidental infiltration of the tissue with the melted paraffine itself is not so apt to ruin the sections for subsequent carmine-staining, as is a similar impregnation with wax and oil. The mixture I use is about one part of oil of turpentine or benzine to twelve or sixteen of paraffine. The embedding is easiest done as follows: In order to get a mould for the paraffine, which shall yield a cast of the right size to go into the barrel of the section-cutter, a solid brass plug (Fig. 4 of the woodcut) one inch high, and made to exactly fit the bore of the barrel, forms part of the apparatus. In one end of it an oval excavation is countersunk, to let the cast of paraffine take a firm hold of its surface, and to keep the same from turning round under the pressure of the knife. A strip of letter-paper, about two inches and a half wide is now wrapped tightly around this plug, the plug being in the middle of the strip, so that the paper projects at both ends. The part projecting beyond the flat end of the plug is folded down over it, and the opposite projecting cylinder of paper then forms a cup, with the excavated face of the plug for a bottom, of the exact calibre of the barrel of the section-cutter. Into this the melted paraffine is to be poured. A capsule containing paraffine or wax and oil, in considerable excess of the amount required for the embedding, is held over a lamp until the mass is just melted, when it is taken off and the piece of tissue dropped into it, and stirred about for a few minutes to rinse off the excess of oil of cloves. Then some of the melted material is poured into the paper mould, the piece of tissue immediately transferred to the same, arranged in proper position, and the whole set aside to cool. The hardening may be hastened by standing the mould in a basin of water, the water, of course, not being allowed to come over the top. When perfectly cold and hard, the paper is unwrapped, care being taken not to loosen the paraffine cast from the brass plug, and cast and plug together are then pushed into the barrel of the holder, and each section is cut by a single sidelong sweep of the cutter. It is usual in cutting sections to flood the surface of the tissue and the blade of the knife with alcohol, so that the section, in cutting, floats freely over the blade. In this apparatus, however, from the great length of the knife, and from the fact that its edge is raised off the surface of the holder, this procedure is impracticable; but I find that I get even more perfect sections by the plan of cutting dry—that is, without flushing the surface of the tissue with any fluid. It will be seen in the figure that the knife is set at a slight angle in the frame; and this obliquity seems to give the section a tendency to curl away from the knife-blade in the cutting, so that in this dry process there is not only no more, but there is actually less danger than by the wet method of the section clinging to the blade in the cutting, and so getting torn. But here the preliminary impregnation of the tissue with oil of cloves is essential; for, were it in alcohol, the microscopically thin section would instantly become ruinously dry as soon as cut. The oil of cloves, however, from its very slight volatility, keeps the tissue of the section moist until it can be transferred to a fluid. But it will not do so long, and, hence, the moment a section is cut, it should be promptly seized, and dropped into fluid; and, if, from imperfect impregnation before embedding, the surface of the cut tissue looks dry, it should be *moistened* only by a touch of a camel's-hair brush dipped in oil of cloves. If the sections are not to be stained, they are dropped into turpentine as soon as cut; this dissolves the adhering wax or paraffine, very promptly if slightly warmed, and the sections are then ready for examination or mounting. If they are to be stained, they are put into alcohol instead of turpentine. This in a few minutes dissolves out the oil of cloves, and the sections are then put at once into the carmine staining-fluid. For this I much prefer the solution of carmine in borax and water to the ammoniacal solution, and I obtain the best results from an intense staining in a strong solution,[1] and subsequent prolonged decolorizing with oxalic acid. Using the solution given in the foot-note, the sections are left in it for from half an hour to one hour, or until they are uniformly stained of a deep, purplish crimson. The staining-fluid is then poured off, and, *without any washing at all*, a saturated solution of oxalic acid in *water* is poured on. This instantly precipitates the dregs of the carmine in the dish, and changes the color of the sections to a bright scarlet. As soon as it has done so thoroughly, it is poured off, and a little fresh solution added. In this the sections are allowed to steep until the color is discharged from all but the cellular or protoplasmatic elements of the tissue. This takes, as a general rule, about as long as the original staining, but the time varies with different tissues; hence it will not do to trust to any rule, but the sections should be watched and the proper moment seized for stopping the action. This can, after a little practice, be told from the naked-eye appearance of the sections, but, if there is any doubt, one of them may be taken out and examined under the microscope. When the desired effect is produced, the oxalic acid solution is poured off, and the sections washed in several changes of water. They must not, however, be allowed to soak in water for any length of time, or the bright-scarlet color produced by the action of the acid will fade to a dingy purple.[2] If intended only for examination, the sections, after rinsing in water, are to be soaked in alcohol for a few minutes, then in absolute alcohol for another few minutes, then in turpentine (best slightly warm) till the alcohol is displaced and the fragments of wax or paraffine still clinging to the sections are dissolved, when they may be examined either in turpentine or oil of cloves. If intended for permanent preservation, it is safest to let the sections, after the rinsing in water, soak for a few hours at least in alcohol, to thoroughly remove all traces of oxalic acid. Then, after passing through absolute alcohol and turpentine, they are ready for mounting in Canada balsam, or dammar, or other turpentine varnish, as may be preferred.

---

[1] Bichromate of potash, 75 grains; sulphate of soda, 25 grains; water, 6 fluidounces.

[2] The light-colored samples are best for use in microscopy.

---

[1] Carmine, half a drachm; borax, two drachms; water, four fluidounces.

[2] The usual process is, after staining, to wash off the excess of the staining-fluid with alcohol, then treat with a saturated solution of oxalic acid in alcohol, and then wash from this again in fresh alcohol. From the great amount of alcohol thus consumed, I was led to try the water-process detailed above, and from comparative experiments I find it gives identical results with the alcohol process, and is, it is needless to remark, infinitely cheaper.

Such is the process to be followed in preparing sections with the use of the section-cutter, when the sections are intended to be examined in oil of cloves, or mounted in a turpentine menstruum. But it must not be understood as implied that this tedious process is to be followed as a matter of routine in all examinations of tissues where sections are required. Such is far from being the case, but to detail the various processes used in histological microscopy is not within the scope of this paper.

The woodcut represents two accessory pieces of apparatus that have not be enalluded to. These do not come into play in using the section-cutter for cutting eyes, but, as they make the instrument complete for other purposes, it is well to describe them here. Fig. 3 represents a secondary barrel with a half-inch bore, which can be screwed into the bottom-piece of the main barrel to diminish its size when any small pieces of tissue are to be embedded. It has a plug made to fit it similar to the large plug of the main barrel. Fig. 2 is a simple and ingenious contrivance, devised by Mr. Wale, the maker of the instrument, for holding hard substances which will bear squeezing, and which, therefore, it is not necessary or desirable to embed, such as cartilage, horn, wood, etc. It consists simply of a brass plug, made to fit the barrel of the section-cutter, hollow, but with the bore slightly conical, and with a screw-thread cut on its face. A few wedge-shaped pieces of soft wood of different sizes, roughly whittled out, complete the apparatus. Supposing a stick of wood is to be operated on, it is grasped between two of the wedges of the right size, being allowed to project somewhat above their tops, the whole pressed firmly into the conical bore of the plug, and with a turn or two the soft wood of the wedges is tightly grasped by the screw-thread of the plug, and the object to be cut, tightly jammed between the wedges, is immovably fixed. Sections can then be cut from the projecting portion in the usual way. It may be remarked, in passing, that the cutter for anatomical tissues must not be used for hard substances. For these a strong, heavy knife or chisel of less brittle temper is to be employed.

In conclusion, it may not be amiss to state that the section-cutter and accessories can be obtained (to order) of the makers, Messrs. Hawkins and Wale, physical-instrument makers, Stevens Institute of Technology, Hoboken, New Jersey. Price $30.00, or, without the knife-frame, $20.00. The knife is a simple affair and can be made by any first-class manufacturing cutler from the dimensions given above. Mine was made by Mr. A. Eickhoff, 381 Broome Street, New York, price $3.00.

27 WASHINGTON PLACE, NEW YORK, *September*, 1871.

GENERAL SYPHILITIC INFLAMMATION OF THE EYE. By Francis Delafield, M. D., of New York.

It is well known that the introduction of the syphilitic virus into the system is frequently followed by inflammation of different portions of the body. The inflammations due to this cause are simple, hyperplastic, or produce a cellular new growth, to which the name of gummy tumor is usually given.

The eye is very frequently the seat of these various forms of inflammation. The iris and choroid are the portions which are most frequently attacked. The inflammation is simple, or forms small cellular new growths.

In rare cases, however, the inflammation becomes general; iris, choroid, ciliary body, retina, sclera, and cornea, are involved, and the production of new cells is so great that staphylomatous tumors of large size are formed.

The literature of such cases is scanty.

Arlt describes two cases of anterior staphyloma produced by syphilitic new growths from the edge of the iris and ciliary body; but no anatomical examination of the eyes was made.

Von Hippel (Graefe's Arch., XIII., 1) gives a full description of a case in which the iris, choroid, sclera, cornea, and retina, were involved, and a large staphyloma formed.

Two cases of this character have come under my observation:

Case I.—A negro, aged twenty-two, was treated in February, 1866, for primary and secondary syphilis. In the following April, his left eye became inflamed, red, with an abundant catarrhal, but not purulent, secretion. The sight of the eye, after this, became gradually worse and worse. In June, severe pains in the eye and temple supervened, increasing at night. These pains continued up to the time of extirpation. In October the eye projected so much that the lids could not be closed. The conjunctiva was much thickened, and the cornea could hardly be distinguished from it. The eye looked as if it were the seat of an intraocular growth, which was pushing the cornea forward.

On October 20, 1866, the eye was removed by Dr. H. D. Noyes. It had been kept for several days in glycerine before I received it.

There was an annular staphyloma at the junction of the cornea and sclerotic around the entire circumference of the cornea. The sclera preserved its proper shape up to the edge of the staphyloma. The edges of the cornea were carried out with the staphyloma so that the anterior surface of the cornea was nearly flat.

The staphyloma was filled with a new growth, partly white and partly black, which also extended backward a short distance into the cavity of the globe.

The iris had disappeared in the new growth. The lens also could not be seen.

The choroid was thickened throughout, especially anteriorly by an increase of its normal pigment-cells.

The ciliary body was much thickened. It consisted of fibres, small round, oval and fusiform cells, and pigment cells; its anterior portion was continuous with the growth filling the anterior chamber. This growth near its attachment to the ciliary body was firm and composed of fibres, with round, and fusiform cells; near its centre it was softer, the cells more numerous, and many of them broken down.

The retina was detached in a funnel shape; its anterior edge was attached at the ora serrata, but was involved in the new growth. It was too much altered by the glycerine for minute examination. The retina was pressed together by a firm, hard clot situated just behind the tumor.

The cornea was infiltrated with great numbers of lymphoid cells. The anterior elastic lamina was intact and the anterior epithelium but little changed. The posterior elastic lamina had disappeared, and the posterior portion of the cornea was ragged and irregular, composed entirely of cells. Although the growth in the anterior chamber was in apposition with the posterior surface of the cornea, it was not continuous with it.

The conjunctiva around the cornea was thickened by lymphoid cells beneath the epithelium.

So much of the sclera as formed the wall of the staphyloma was infiltrated with cells.

Case II.—The eye was removed by Dr. H. D. Noyes from a negro, aged twenty-four. In the spring of 1869 the patient contracted a chancre, which was followed, in two months, by secondary symptoms. He was first seen in November, 1869. At that time there was a large ulcer on the penis. He said that, twenty-five days before, a piece of his finger-nail accidentally got into his left eye and remained there about two minutes. A week after this the eye became painful and red, and a week later the right eye also became inflamed. When he presented himself, in the left eye the cornea was hazy; at the lower and inner margin of the cornea there was a staphyloma of the sclera; there was complete posterior synechia of the iris, with exudation in the anterior chamber; the conjunctiva and sclera were hyperæmic; tension was normal; there was bare perception of light.

In the right eye, the cornea was hazy; there were posterior synechiæ at the lower and outer edge of the pupil; the anterior chamber contained exudation; the conjunctiva was hyperæmic; he could count fingers. February 15, 1870, the right eye had improved. The left eye became more painful and began to protrude, until the lids could hardly be closed.

March 2d.—The left eye was removed.

The eye was divided by a section passing through the apex of the staphyloma.

The staphyloma was situated in the sclera opposite the junction of the ciliary body and choroid. The staphyloma and the anterior half of the globe were filled with a white mass. The sclera as it approached the staphyloma was pushed outward, thinned, and finally lost in the new growth. That portion of it which formed the staphyloma contained many lymphoid cells between its fibres, and at the apex of the staphyloma the fibres disappeared, and nothing but cells could be seen.

The conjunctival epithelium was but little altered. Around the staphyloma the stroma of the conjunctiva was much thickened and infiltrated with cells, its vessels were distended with blood.

The anterior chamber was filled with a blood-clot.

The iris was thickened; in its stroma were lymphoid cells and coagulated fibrine; the pupil was closed.

The choroid over the fundus was normal. As it approached the staphyloma it became thick and of a gray color. The thickening was due to the presence of lymphoid cells and coagulated fibrine. Near the apex of the staphyloma all the normal elements of the choroid disappeared, and nothing but round cells could be seen. No changes could be seen in the pigmented cells of the choroid, except that they had disappeared.

The ciliary body was everywhere thickened and filled with cells. Its periphery extended into the staphyloma, and was continuous with the new growth there.

The lens was small. Its capsule remained, partly filled with broken lens-fibres.

The retina was detached in a funnel shape; its anterior portion was lost in the new growth.

Of the white mass, which filled the anterior portion of the globe and the staphyloma, the anterior portions were composed of lymphoid cells, with a scanty stroma of connective tissue, the posterior portions of coagulated fibrine entangling cells.

These two cases differ both in the situation and character of the lesion. In the first case, the new growth has more of the character of a permanent new growth than of an inflammatory product. It is composed entirely of cells, in some places arranged in a thick fibrous stroma. The new growth originates in the iris and ciliary body, and fills up the space formed by the protrusion of the cornea. At the edge of the cornea the sclera is infiltrated and softened with cells so as to form an annular staphyloma.

In the second case, on the other hand, the growth is more distinctly inflammatory. The new cells are mixed with a plentiful exudation of fibrine. The iris and ciliary body are but little affected, while the choroid is involved over a considerable area.

12 West Thirty-second Street.

THE HALO ROUND THE MACULA LUTEA. By EDWARD G. LORING, M. D., New York.

THE actual demonstration of any new physiological or anatomical fact, however trifling, is, of a necessity, both of interest and value. Any sincere attempt to make such a demonstration, even if unsuccessful, may be of some future if not present advantage. It is with this hope, at least, that I now offer the following remarks:

The explanations of the glittering ring seen round the region of the yellow spot with the ophthalmoscope, as given by Liebreich, Schweigger, Schirmir, and others, have never been accepted by physiologists as conclusive; and Mauthner, in his recent work on the ophthalmoscope, brings an exhaustive review, of the many attempts to solve the problem, to a close, with the assertion that the phenomenon cannot be accounted for on anatomical grounds with the knowledge of the part now in our possession.

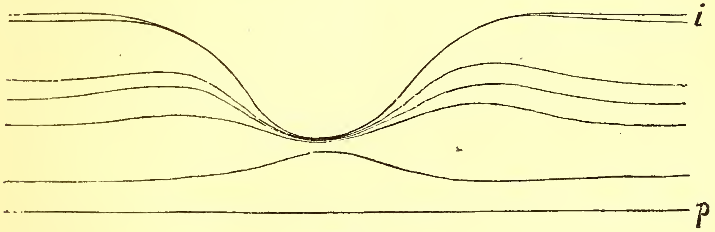


FIG. 1.

On looking at some drawings of the region of the macula, by Max Schultze, one of which I now reproduce in a diagrammatic form[1] (Taf. vi., Fig. 1), it occurred to me that the effect in question might be produced by the same causes within the eye that often produce it in other places in nature, or, in other words, that it might be the products of reflexion and refraction from the combination of curved surfaces which enter into the construction of this portion of the retina.

---

[1] The outlines and curvature of the different layers are fac-similes of Schultze's original drawing. The scale is here, however, reduced one-half; *p* represents the pigment epithelium, and *i* the nerve-fibre layer.

As you will see, this region, as figured in the diagram (Fig. 1), bears in its formation a strong resemblance to a shallow cup, of which the rim is represented by a convex and the bowl by a concave surface. If we look upon these curved surfaces as mirrors, they would each have their foci, one lying behind the other in front according to their respective degrees of curvature. And if light should be thrown perpendicularly against such a combination of curves, the apex of the outside rim or convex surface would, from well-known optical laws, appear illuminated, while the inside or concave surface would appear more or less in shadow. Thus we should have the effect of a darker centre, surrounded by an illuminated edge.

In order to demonstrate this in its application to the retina, two eye-phantoms or cameras were made, precisely alike in every respect. At the bottom of one a concave metal mirror, belonging to an ophthalmoscope, was placed to represent the retinal surface. Another mirror, precisely like the first, was then taken, and a very slight depression made in it by carefully pounding down the region immediately about the hole in the centre, with a rounded chisel-handle. As the implement was made of wood, a shallow indentation was made without cutting into the substance of the mirror. This was placed at the bottom of the second camera, and represented, in a rough but sufficiently exact way, the cup-like cavity shown in the drawing, as belonging to the yellow spot. The two cameras were then examined with the ophthalmoscope.

The first gave a perfectly distinct image of the mirror at its bottom, exactly as we should expect to see it, with the hole in the centre, with clearly-defined edges; but in the second camera the hole was surrounded by a brilliant circle, corresponding exactly to the limits of the depression, while the central portion seemed to be somewhat in shadow. An idea, although a very rough one, of the effect can be formed from the following diagram, in which *A* represents the camera, in which the mirror had been left in its natural condition, and *B* the one in which the slight central depression had been made.

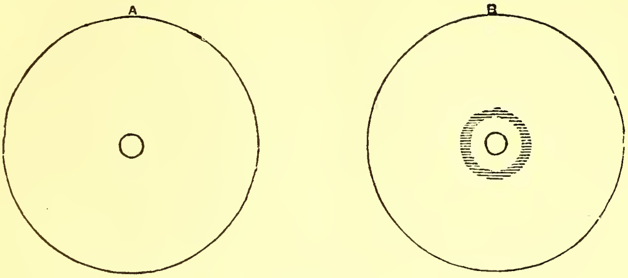


FIG. 2.

In showing this experiment to a *confrère*, I was told that, striking as it was, it could not embody the right explanation of the affair, inasmuch as there was, in fact, no such depression of the entire region of the macula as I had been led to suppose from Schultze's diagram; that the only depression in the whole surface of the retina was confined to the fovea itself; and that this, as was self-evident, was entirely too small to give so extensive a reflex; and, finally, that Schultze's figure was merely a diagrammatic representation of the fovea very much enlarged.

If this is true, then, of course the experiment, and with it the explanation, falls to the ground; and it cannot be denied but that Henle distinctly states that the only depression in the whole surface of the retina is just at the fovea centralis itself. But it is by no means so certain that the excavation pictured by Schultze is meant to represent only that of the fovea, or that it is an exaggerated and diagrammatic representation for the mere purposes of explanation. On the contrary, he states distinctly that "all the layers, excepting the rods and cones, are copied exactly from a section through a normal human retina; the drawing, as here represented, shows the macula lutea without plica, *consequently as it actually is in life*" (*loc. cit.*, p. 109).

Schultze has given, too, the scale on which the drawing was made, namely, an enlargement of one hundred and ten times. If we now measure, in his diagram, the extent of surface on the retina which is stained yellow, and which it is to be supposed was meant to represent the extent of the region of the macula lutea, we find it is 158 millimetres. This, reduced to the normal size, would give for the measurement of this region 1.4 millimetre, which corresponds to the average dimension, as determined by the majority of observers. Again, if we suppose that Schultze meant the depression to be confined solely to the fovea, and under this supposition we measure the distance across the actual mouth of the cavity as figured in the diagram, we find it is equal to 110 millimetres, which, reduced, gives an actual size of 1.0 millimetre, which is five or six times as large as it is in the normal eye, so that it is not possible that the cup-shaped depression is meant to represent nothing but the fovea. There can, indeed, be no doubt but that Schultze meant to give in his picture an exact counterpart of this region of the retina as it really is in nature, and, if so, there is no reason why the conditions represented in the experiment should not be a sufficiently exact imitation of those in the actual eye.

It must be conceded, however, that Schultze's views and Henle's are diametrically opposed. Can it be that this cup-like depression varies in different eyes, both as to extent and depth, so that in some it shall be limited to the fovea alone, and in others extend, getting shallower as it goes, even up to or near the boundary-line of the entire macula? This would account for the presence of the ring in some eyes, and its absence in others, and its frequent and not inconsiderable variation when present in size and shape.

Bearing in mind that at the macula lutea the nerve-fibre layer ceases to exist as such, and that the nerve-fibres make a peculiar bend here, it occurred to me that a difference in level might be occasioned, which, varying in different cases, might still be sufficiently marked in many eyes to give the effect in question.

In order to show how slight an inequality in surface would produce the phenomenon, and to determine whether it could be possibly produced by the above condition, the following experiment was made:

A piece of thin and perfectly pure tin-foil, such as dentists use, was selected, and its thickness carefully measured under the microscope; this was found to be only $\frac{1}{700}$ of an English line. A flat, circular disk of plane glass was then prepared. A small, circular hole was next cut in the centre of a piece of the foil, which was left somewhat larger than the disk of glass. This latter was then covered with the foil by carefully folding the surplus quantity over the edges of the glass till the surface of the foil was gradually worked perfectly tight and smooth, so as to give finally much the appearance of a flat, thin button, covered with silver, and having in its centre a circular hole, through which the glass was visible. As the thickness of the foil was $\frac{1}{700}$ of a line, the depth of the hole in the centre must be the same.

A second piece of foil, having, however, no hole in its centre, was now stretched as above, over the first covering, and the surface was then gently rubbed till the upper covering had moulded itself under the pressure into the hole in the covering beneath.

The effect of this was to give a perfectly smooth surface, with a very slight depression in the centre. The depth of this depression, even if it was equal to that of the hole itself before the second covering was put on, could not be more than $\frac{1}{700}$ of a line, but it must be in fact much less, as it is evident that the depth must decrease with each covering. The disk was then fitted to a camera and observed with the ophthalmoscope just as in the former experiment, and with precisely the same result. The glittering ring, marking the boundary of the depressed region, was present in a marked degree, and showed a very striking resemblance, both in size and appearance, to that seen in the actual eye.

We have taken, it must be borne in mind, the depth of the depression as $\frac{1}{700}$ of a line, a difference in level which seems almost inappreciable, and which is, in fact, three times less than the thickness of the single layer of epithelial cells between the retina and choroid. Now, as the nerve-fibre layer is, at the distance from the optic disk, corresponding to that of the macula, $\frac{1}{50}$ of a line thick,[1] we should, even if we took the lowest estimate, have tissue enough in the thickness of the nerve-layer alone to make a depression fourteen times as deep as that which produced the effect in the phantom.

---

[1] Ritter. Wecker's Études, t. ii., premier fascicule, p. 51.

And, if for any reason whatever, such as the bending or overlapping of some of the fibres as they enclosed the macula, and the ending of others concentrically around it, a difference of level of even the slightest degree was formed, then the effect might be produced through the nerve-fibre layer alone, without taking into consideration the thinning of the other layers of the retina at this place.

But it may be said that if this difference of level did exist, it ought, however slight it might be, to be seen with the microscope. This we readily admit ought to be the case if we could get sections of the part as it really exists in nature, but it must be borne in mind that it is almost hopeless to do this, on account of the distortion of the part by the formation of the so-called plica at almost the very moment the eye is opened, and this too, letting alone the disturbance of the tissue which would necessarily follow by even the most delicate manipulation, and letting alone, too, the minor difficulty of even getting a section directly through this region.

It must, too, be admitted that, with all the labor and talent which have been expended on the anatomy of the retina, we still know little about that of the nerve-fibre layer in the region of the macula. Under these circumstances may not the ophthalmoscope have a voice in explaining a phenomenon which is in strict accordance with physical laws, and which, outside of the eye, can only be so explained ?

How far the peculiar arrangement of the anatomical elements of the different layers which enter into the construction of the part, and which go to make this inequality of level, contributes to the effect, we will not attempt to determine; it is the difference of level itself which we would insist upon as the essential factor in the production of the phenomenon.

There are one or two additional points which go to prove that the effect is due to difference of level, one of which is the fact that we often get a reflex of precisely the same character along the vessels; and we know from the microscope that these often project, though still covered with the nerve-fibres, above the level of the retina.

A second argument in its favor is the peculiar reflex seen at the fovea centralis, with the *upright image*, first pointed out by Coccius, and the usual shape of which, as you are aware, is that of a horseshoe, which changes from side to side according to the movements of the eye.

Now, we know that the fovea is described by most anatomists as a narrow fossa with pretty sharply-descending walls, and the shape of the reflex is just such as would come from a narrow-mouthed pit; for, while one side was turned so as to catch the light and reflect it, the other edge would be turned so that no reflex would come back from it, consequently we should have a crescent or half-moon-shaped reflex, changing its position as it really does with every movement of the eye.

The reflex of the fovea, even when present, is not, however, always of a crescentic shape, for it sometimes has the appearance as if it were only the segment of a small circle which was illuminated, or as if the fossa were a triangular one, and light were reflected from only one side of it, in which case the reflexion streams out something like the tail of a very minute comet; again, it has the appearance of a delicate phantom-like veil stretched, in part, or entirely, across the fovea; and, then again, there is no reflex at all, and the fovea looks like a small yellow dot, varying in size and shape, and has the appearance as if it had been flecked directly on to the surface of the retina with a brush.

May not these differences in effect of the reflexion, when present, be due to variations in anatomical construction of the part, and principally to differences in shape and depth of the excavation; and, when the reflex is absent, may not its absence be due to the want of any difference in level?

These are questions which the anatomists must answer, but one thing is certain: where there are such marked variations in effect, there must be also marked variations in cause.

In regard to the fact which Mauthner emphasizes as so curious and unaccountable, that we only get the halo round the macula with the inverted image, and never, under any circumstances, with the upright, I have only to offer in explanation that we should bear in mind that the apparent diameter of the region of the yellow spot, under the enlargement of the upright image, would be, on the average, about one inch, which is much too large for the entire circuit to be in view at once; and furthermore that, do what we will, the illumination with the upright image is never so strong, or so concentrated on a small surface, as with the inverted.

But I would add, while admitting Mauthner's statement as almost a law, that occasionally I have got a distinct but very faint segment of reflection which I could make play about in that portion of the retina where I imagined the boundary circle of the yellow spot should be.

A SCHEME TO AID IN EXAMINING AND RECORDING CASES OF FUNCTIONAL TROUBLE OF THE EYE. By Dr. Henry D. Noyes, New York.

For about eight months I have been using a printed form in keeping records of cases of functional troubles of the eye. I found such a device desirable, to insure regularity and completeness in the examination, and for convenience in preserving notes. I have been able to put my records in a form which admits of easy reference and classification, and in doing this have secured the minimum expenditure of time.

In framing a blank for this purpose, I have included only certain classes of cases—viz., those which came under the designation of asthenopia, using the word in its widest and former significance. I thus include errors of refraction and of accommodation, and muscular disturbances.

It may not be deemed needful in every patient to ascertain all the data for which the scheme makes provision ; and, on the other hand, there may be many noteworthy facts in addition to what are provided for. In the one case, certain items in the scheme will be left vacant, and, in the other case, the filled-up blank may be used as part of a full account of a case. The plan has commended itself to my use both for utility and convenience, and I venture to explain it for the benefit of any who may choose to adopt it, or may find it suggestive of some more perfect form.

I may remark that I have kept notes of one hundred cases by this method.

The blank form[1] is as follows:

Diagnosis.

....18..........

M..

Refraction.	R.	V. =	*Both.*	=
	L.	V. =		

Accom. =	Relative A. at....in. =	$\pm$

Muscles.	*Adduct.* at............in. =	° : with v. d.	at. . .in. =	°
	" with....at....in. =	° : with v. d. and. . .at. . .in. =		°
	Abduct. at............in. =	° : with............at. . .ft. =		°
	" with....at....in. =	° : with v. d. and. . .at. . .ft. =		°
	Linear deviation at....in. =	: at...................ft. =		

Ophthalmoscope.

History and Treatment.

The explanation of the above is as follows:

I put the diagnosis at the top to serve as a title for refererence; then comes the date, and then the patient's name, occupation, age, nativity, and I often add weight.

The first inquiry respects the state of refraction in each eye singly, the letters R and L standing for right and left, and the space beyond serving to record the number of the glass needed to correct distant vision, if any be required. This applies to astigmatism as well as to other errors. The letter V designates the visual acuteness conferred by the glass. I sometimes find the sight, with both eyes together, sensibly more acute than with one alone, and indicate it after the word "both." As a sample of this kind, I quote the following:

R. = — 8 spherical—48 cylind. axis 155° v = $\frac{20}{30}$	Both	= $\frac{20}{20}$?
L. = — 8 spherical—48 cylind. axis 155° v = $\frac{20}{30}$		

The last interrogation-mark shows that, while with both eyes vision was better than with one, the difference was not equal to one gradation of Snellen's test-type; patient could read some letters of Snellen xx at 20 feet, but not all of them. A patient who needed no correcting-glass would be marked E. for emmetropia. If, in making this examination, a solution of atropia has been used, the letters *a t r* may be put into the space.

---

[1] The actual schedule occupies a larger sheet than is allowed by the size of this page, and a copy is enclosed for trial; more may be obtained from the publishers.

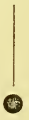
The next step in the inquiry relates to the capacity for near vision, in other words, the function of accommodation—which is indicated by an abbreviation of the word. The relative accommodation may also be subject of examination, and the blank means what positive and negative glasses can be worn in reading Snellen $1\frac{1}{2}$ at a certain number of inches. Thus, for a given case, a patient of seventeen years old, the record stands: Accom. $= \frac{1}{4\frac{1}{2}}$. Relative A at 8 inches $= \genfrac{}{}{0pt}{}{+20}{-18.}$ He has myopia $\frac{1}{36}$, and the test of accommodation is for both eyes together.

I take up next in order the function of the muscles of the eyes—the power of adduction and abduction—as tested by prisms.

Beginning with adduction, the first point is, what is the strongest prism, with horizontal axis and angle inward, which the interni can overcome, the test-object being at a specified number of inches distant? The next line below provides for a few cases in which a positive or negative glass may be requisite in testing the adduction.

On the right half of the line may be recorded what happens when a prism with vertical axis causing "vertical diplopia" (v. d.) is placed before one eye and the test-object at a specified distance. In such a case, a patient may be able to overcome a prism with its angle inward, and keep the two images perpendicularly over each other. The fact and the number of the prism are stated by putting down the number of the prism with the positive sign + prefixed to it; thus, adduction with v. d. (vertical diplopia) at 14 inches = + 8°. If unable to overcome any prism with vertical diplopia, but simply preserving equilibrium of the muscles, it is stated by writing = 0°. But, if the vertical diplopia is likewise crossed diplopia, and, to bring the images to perpendicularity, requires a prism before one or both eyes, with its angle outward, this fact is denoted by writing = — 10°. This means that, for the distance of the test object, there is a degree of *insufficiency* of the interni, expressed by a prism of 10 degrees. By using the sign + to express positive power, and the sign — to denote defect of power, the long word "insufficiency" may be avoided, while the fact can be clearly expressed. Sometimes positive or negative glasses may be added in making this test, and that the line beneath provides for, viz., adduction with v. d. and (— 12 or + 16, for instance) at 12 inches = — 6°, which means that, when these glasses are worn, there appears an insufficient adduction of 6 degrees.

It may be well here to describe the way which I have found most convenient for making these examinations. I have had a light frame or apparatus of wood made, whose plan was adopted from one of the simple forms of stereoscope. If one of these stereoscopes, which carries the picture in a transverse bar, sliding up and down a central stem, should be supplied, in addition to its prisms, with receptacles for slipping in two pairs of glasses, the thing I use in examining the function of adduction would be made. The stem on which the test-object slides is eighteen inches long, and is marked off in inches and half-inches, the measurement being from the face of the patient. There are slits, or pockets, for two pairs of glasses, besides the prisms. Two pairs of glasses are provided for, so as to permit the use of a colored glass, and also of a positive or negative glass. The prisms are held by little brass catches, and easily slip in and out. The whole is held by a knob underneath the stem. I find this frame more convenient than any spectacle-frame. It is available for testing the accommodation as well as the muscular power by putting on the sliding bar a card, on which type from Snellen's book has been pasted. It is very easy to slide this up and down the stem to any point, and the distance at which the print stands from the eye is at once read off on the scale. The test-object for adductive power, which has in my practice displaced others, is a white dot and line painted on a black card. The dot and line are of this form: I prefer this to either the dot alone or to the dot with a line both above and below. The line, as I make it, enables a patient to tell



whether the false and true images are really perpendicular; by having it only on one side and short, the prism being 10° or 12°, the images are always apart from each other, and the patient is not tempted to put forth efforts at fusion of the images, which I have noticed to occur when the prolonged line of one image overlaps the other. A white image on a black surface is more conspicuous than black on white, and, when a red glass is put before one eye, the difference in the two images is instantly recognized. A case illustrating the points above set forth as to the adductive power is the following:

Mr. C. B., twenty-nine, farmer, Red Bank, N. J.:

R. +12 spherical—48 cylind. axis 70° $v=\frac{20}{20}$.

L. +12 spherical—36 cylind. axis 90° $v=\frac{20}{20}$.

Adduct. at 14 inches=36° : with v. d. at 14 inches=0°.

Adduct. at 14 inches with +7=8° : with v. d. and +12 at 14 inches =—4°.

Adduct. with v. d. and +7 at 14 inches =—16°.

The employment of convex glasses, which neutralized his hypermetropia, elicited a slight amount of muscular insufficiency, which remained latent to trials by prisms without glasses; furthermore, by strengthening the glasses so as to suspend accommodation, the relaxation of muscular energy became still more remarkable. In treating the case, glasses which corrected the refractive error relieved the pain, and have been satisfactory for six months. In cases of myopia and muscular insufficiency, it is often needful to learn the state of adduction with concave glasses as well as without them.

Investigating *abduction:* the first inquiry is simply its amount at the usual reading distance without glasses, then its amount with glasses at the same distance. The next is abduction with parallel visual lines, that is, at twenty feet, and after this at the same distance when vertical diplopia is produced. These inquiries furnish a full exhibit of the state of adduction and abduction from which to draw suitable therapeutic deductions.

"*Linear deviation*" at a short distance—three or four inches—is obtained by concealing one eye while the other fixes on an object at the given distance in the median line, and, after removing the screen, by measuring in the lower lid the number of lines which the previously-covered eye has turned away from the proper line of convergence. If the object fixed upon be at some feet distance, and one eye deviates, the case becomes one of actual diverging strabismus.

In the above schedule I have not thought it worth while to consider the degree to which each eye may be implicated in the defect. If an operation is to be performed, each eye must be tested, so that, if but one muscle is to be operated on, the proper eye may be selected in case there should be a choice. Very often it is of little moment which eye should be chosen.

For ophthalmoscopic appearances no large space is designated, because usually there is not much to be described. Finally, the history of the case, other symptoms, and the treatment, may be recorded.

I file away the loose sheets in pigeon-holes, and, when they accumulate inconveniently, paste them into a letter-file with an index.

I do not pretend to submit every case of functional trouble of the eye to the minute investigation which is here laid out; such labor is impracticable, and many times unnecessary. But, when a thorough examination is to be given, a proper method is observed, and full notes are quickly taken.

73 Madison Avenue.

ON THE TABLES GIVEN BY LORING AND KNAPP TO SHOW THE DISPLACEMENT OF THE RETINA IN AMETROPIA. By Dr. O. F. WADSWORTH, Boston, Mass.

In a "Report on Ophthalmology for 1870," which appeared in the *New York Medical Journal*, February, 1871, the writer, in the course of a notice of Knapp's paper, "The Influence of Spectacles on the Optical Constants and Visual Acuteness of the Eye" (Arch. of Ophthal. and Otology, vol. i., No. 2), called attention to an apparent discrepancy between the table given by Knapp[1] to show the amount of displacement of the retina in given degrees of ametropia, and a table which had been given by Loring for the same purpose (*American Journal of Medical Sciences*, April, 1870, p. 335).

These tables may be of practical importance, as enabling us to determine with some accuracy the amount of elevation or depression of different portions of the fundus, and so assisting us in diagnosis, in cases of intra-ocular tumors, for instance. It seemed worth while, then, to determine whether any real discrepancy between them existed or not.

Loring, following Mauthner[2] in the use of a formula given by Helmholtz,[3] shows in his table the amount of displacement in certain degrees of ametropia. Knapp, using another formula given by Helmholtz,[4] shows the amount of displacement in degrees of ametropia which are corrected by a lens of a certain number of inches focal distance (positive or negative), placed at the anterior principal focus of the eye. The anterior principal focus of the eye being 20.29 mm., almost exactly $\frac{3}{4}''$, in front of the second nodal point, we must therefore subtract $\frac{3}{4}$ from the number of the glasses given by Knapp to obtain the degrees of hypermetropia, and add $\frac{3}{4}$ to obtain the degrees of myopia referred to in his table. This change having been made, it is seen, on comparing the two tables, that the degrees of hypermetropia and myopia for which the calculations were made are, except in one instance, different, and the amount of the displacement given varies not more than this difference might perhaps account for, if both methods of calculation be correct. In the one instance in which the displacement for the same degree of ametropia is given in both tables; viz., M.$\frac{1}{2}$, the tables do not agree. This is, however, not the fault of the formulæ. Loring gives the displacement as 8.6 mm., and Knapp as 8.26 mm. There is here an error in Knapp's table; instead of 8.26 mm., it should be 8.72 mm. This still gives a slight difference, but it is due to the fact that Mauthner, and after him Loring, estimated degrees of M. from the first nodal point, and degrees of H. from the second nodal point; while Knapp estimated degrees both of M. and H. from the second nodal point. If the calculation be made with the formula used by Loring, estimating the M. from the second nodal point, there is no disagreement.[1]

---

[1] *Loc. cit.*, p. 397.

[2] Lehrbuch der Ophthalmoscopie, pp. 67, 226, 227.

[3] Handbuch der Physiologischen Optik, p. 54.

[4] *Loc. cit.*, p. 56.

Pursuing the investigation still further, an examination of the formulæ used by Knapp and Loring shows that they are convertible, and must, therefore, with the same premises, give the same results.

Knapp, by means of the formula—

$$a_{\prime\prime}\, t_{\prime\prime} = \frac{(d - f_{\prime\prime})\, \phi_{\prime\prime}}{d - \phi_{\prime} - f_{\prime\prime}}, \text{ calculates } a_{\prime\prime}\, t_{\prime\prime},$$

the distance of the retina in a given eye from its second principal point.

Loring, from the formula—

$$l_2 = \frac{\phi_{\prime}\, \phi_{\prime\prime}}{l_{\prime}}, \text{ calculates } l_2,$$

the distance of the retina in a given eye from its second principal focus.

---

[1] There is also an error in Loring's table. The displacement for M.$\frac{1}{11}$ should be 1.06 mm., instead of 1.62 mm. as given.

Both take the schematic eye of Listing as a basis, and assume that the refractive system always remains the same.

l_2, the distance calculated by Loring, is equal to $a_{\prime\prime}\, t_{\prime\prime}$, the distance calculated by Knapp, less $\phi_{\prime\prime}$, the second focal distance of the eye. Subtracting $\phi_{\prime\prime}$ from both terms of the formula used by Knapp, we have—

$$a_{\prime\prime}\, t_{\prime\prime} - \phi_{\prime\prime} = \frac{(d - f_{\prime\prime})\, \phi''}{d - \phi_{\prime} - f_{\prime\prime}} - \phi_{\prime\prime} = \frac{\phi_{\prime}\, \phi_{\prime\prime}}{d - \phi_{\prime} - f_{\prime\prime}} = l_2$$

The value of l_2 used by Loring is $\frac{\phi_{\prime}\, \phi_{\prime\prime}}{l_{\prime}}$. $l_{\prime}$ denotes the distance at which the image of the retina of an eye formed by its refractive system stands from its first principal focus. On referring to the definition given by Helmholtz of the terms used by him,[1] we find that d denotes the distance at which the corrective lens[2] (the lens which renders rays coming from the retina parallel) stands from the first principal point of the eye. The image of the retina formed by the refractive system of the eye is the posterior focal distance of the corrective lens ($f_{\prime\prime}$) behind the lens; and the first principal focus of the eye is its anterior focal distance ($\phi_{\prime}$) in front of its first principal point.

Therefore $l_{\prime} = d - \phi_{\prime} - f_{\prime\prime}$, and $a_{\prime\prime}\, t_{\prime\prime} - \phi_{\prime\prime} = \frac{\phi_{\prime}\, \phi_{\prime\prime}}{d - {}'\phi - f_{\prime\prime}} = \frac{\phi_{\prime}\, \phi_{\prime\prime}}{l_{\prime}} = l_2$.

[1] *Loc. cit.*, p. 56.

[2] We consider, as Mauthner and Knapp have done, that the second principal point of the lens coincides with its centre.

VARIETY OF FORMS OF SMALL PENCILS OF ASTIGMATIC RAYS. By Dr. G. Hay, Boston.

In the accompanying diagram, the lines O X, O Y, and O Z, represent three rectangular coördinate axes. The lines l and l' represent two straight lines intersecting O Z at different distances from O.

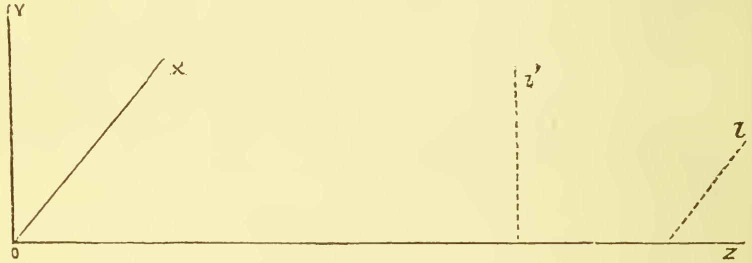


Fig. 1.

It is possible to conceive a *small pencil* of rays (straight lines), such that O Z being one in the body of the pencil, or the axis-ray, each ray intersects the coördinate plane Y X, and the two (focal) lines l and l', not only when these are perpendicular to each other and to O Z, but also for other positions of the two lines (not including, however, the case of the two being in one plane; they being supposed to intersect O Z at different points).

We might suppose l and l' each perpendicular to O Z, but not so to each other; or either or both of them might not be perpendicular to O Z. Also, instead of one of them, a curved line might be substituted.

The above appears from the following: Conceive a plane to pass through the straight line l and O Z, so that both these lie in the plane. Rotate this plane *a very little* around the line l as an axis; it will then intersect the coördinate plane Y X in a line near to O. This line of intersection, a certain point of l', and the line l will then all lie in one plane. Accordingly, a straight line could in general pass from any point of the line of intersection just referred to, through a certain point of l' and some point of l.

By rotating the plane into other positions *quite near* to the first, we see that in general, from any point in the coördinate plane Y X and near to O, a straight line could pass which would intersect both l' and l, and also be quite near to O Z.

It is interesting to compare this conceivable variety of astigmatic pencils with the analysis given by Knapp. (*See* A. f. O., 1862.)

This method contemplates the points in which each ray intersects different planes perpendicular to the axis of the pencil. The axis of the pencil is taken as the coördinate axis O Z. The pencil is supposed infinitely small. The direction of each ray is supposed subject to a certain law, expressed by the following equations:

$$\left.\begin{aligned} x_1 &= Ax_0 + By_0 \\ y_1 &= Cx_0 + Dy_0 \end{aligned}\right\} [1]$$

In these equations x_0 and y_0 are the coördinates of the point of intersection of a ray with the coördinate plane X Y; x_1 and y_1 are the coördinates of the point in which the same ray intersects a plane perpendicular to the axis and at the distance z_1 $(=1)$ from the origin. A, B, C, and D, are constants for any particular case. As the pencil is supposed infinitely small, any higher powers of x_0 and y_0, that might occur in the development of x_1 and y_1, are neglected.

As these equations [1] suppose that a ray which passes through the point $(x_0, y_0, 0)$ also passes through the point $(x_1, y_1, 1)$, and as for any particular x_0 and y_0 the x_1 and y_1 might each, according to the equations, be different for different values of the A, B, C, and D, we should expect that a great variety of pencils might be represented by these equations, and we have seen above that such variety is geometrically conceivable.

Assuming the equations [1], and introducing certain limitations by putting B = 0, and C = 0, it follows that each ray of the infinitely small pencil intersects two straight lines (*l* and *l′* of the figure) perpendicular to each other and to the axis; one of them in the coördinate plane Y Z, and the other in the coördinate plane X Z. This form of pencil may, for convenience, be called the typical form.

The conditions B = 0, and C = 0, limit the form of the pencil somewhat, making it like a pencil of normals to a continuous curved surface; since, with these conditions, all the rays of the infinitely small pencil, which intersect the coördinate axis X, would lie in the coördinate plane X Z, and all the rays which intersect the coördinate axis Y would lie in the coördinate plane Y Z. (For this and the preceding paragraph, *see* Knapp's Archives, vol. ii., No. 1, pp. 82–85.)

The form called above *the typical one* is also, at least approximately, the form of an infinitely small *pencil of normals* to a continuous curved surface; and this latter (pencil of normals) is the form which an infinitely small pencil of originally homocentric light has after refraction at one or more continuous curved surfaces. (*See* Helmholtz, "Physiolog. Optik.," pp. 243–247.)

The general equations [1] would be applicable to other forms of pencils of *straight lines* besides the typical one.

The conclusions arrived at by means of the formulæ given by Knapp, that there may be two focal lines *each perpendicular to the axis*, are subject to certain conditions:

1. The algebraic expressions for the distances of these focal lines from the origin must have *real* values, and not be imaginary.

2. The equations [1] must exactly represent the pencil.

These required conditions do not always exist; for, we have seen above, that cases are conceivable in which one or both of the focal lines are not perpendicular to the axis.

THE RETINA AN ASYMMETRICAL SURFACE. By Dr. Russell Murdoch, Baltimore, Md.

Any one, carefully reviewing the accepted theory of the corneal seat and asymmetrical cause of astigmatism, must feel how very inadequate such an explanation is to account for all its varieties, as well as for all the varied phenomena of those varieties. The incongruity of perfectly non-astigmatic vision with the normal asymmetrical cornea is in like manner unsatisfactory. A factor is evidently missing in both these propositions; we believe the same one in both.

The large majority of asymmetrical corneas found in the examination of the anterior surface of that structure with the ophthalmometer, and by different observers, justifies the statements that, as a rule, its form is that of "the top section of an ellipsoid with three unequal axes," and that it has its "two meridia, the vertical and horizontal; the more convex of which is the vertical." From similar numerical evidence we infer that astigmatism, with all its varieties, is the result of a variation in the curvature of those two meridia; thus, from this one phenomenon two distinct results ensue of a totally opposite character, viz., emmetropia, the most perfect vision, and astigmatism, a form of ametropia. We propose to show that, without a modification of the accepted asymmetrical shape of the cornea, these two propositions can be harmonized, by showing that a surface which is capable of compensating for the corneal asymmetry will not interfere with the known phenomenon of astigmatism, but will even supply the missing factor in the tables where the asymmetry and astigmatism are compared.

The factor we are in search of is not the lens, for the following reasons: first, the asymmetry is not described as existing in the lens in the normal eye; and even when it is present in the abnormal eye, and has been measured, it is of the irregular sort; and, second, Javal has proved that the lenticular surface is incapable of answering the requirements of a case of regular astigmatism, whence, we argue *a fortiori*, still less so as a corrective surface in emmetropia. The argument need not be repeated here; it is familiar to all. The other dioptric surfaces are all those of rotation; and an asymmetry capable of correcting that of the cornea would not have escaped notice, because, from their nature, having but comparatively slight indices of refraction, these surfaces would then have to be pronouncedly asymmetrical.

On examining the retina closely, it will be found that its internal surface is an asymmetrical one, similar and opposed to that of the cornea: a concavity where the other is convex. And here attention must be called to the stationary nature of this surface, which, therefore, is not open to the objection urged in reference to the lens; and also to its equal importance, as a factor, with that of the cornea, because situated at the opposite pole. Looking at the structure of the retina, we discover the optic nerve entering eccentrically and sending its fibres through the retina in a horizontal direction, and by two bundles, which, on separating, leave a horizontal sulcus. It is plain that these optic nerve-fibres must cause an encroachment on the vertical meridian of the ball.

It is hardly required of us to prove that the inner surface is the one which is rendered asymmetrical by the optic nerve-fibres, since it is universally conceded that the external layer is spherical. The conclusion that this surface is asymmetrical gathers weight, when we consider the function and notice the unequal distribution and irregular lengths of the nerve-fibres of Müller: they connect the inner and outer surfaces of the retina, are absent when the nerve-fibres are absent, or where the surfaces, as it were, come together, and are in greatest number and length where the nerve-fibres are thickest. The link supplied by Müller's fibres is all that is wanting to convey a non-astigmatic image (formed on the compensating inner surface of the retina, and formed there by virtue of its corresponding asymmetry to that of the cornea) to the spherical layer of rods and cones. It would be easy, but is not necessary in this presence, to show that the retina is the first to depart from the sphere, and that the cornea is a mechanical contrivance, a sphere and cylinder combined, to correct the effects of its aberration: its greater relative functional importance is a sufficient argument. What we have undertaken to show is, that the surface which corrects the asymmetry of the cornea and produces emmetropic vision will aid in explaining many phenomena of astigmatism. The first is that, where the asymmetry at the anterior pole has been measured and compared with the total astigmatism, they did not agree; a factor, and by no means a uniform one, was found to be wanting; such a one as would be supplied by a varying asymmetrical surface corresponding to the cornea itself. Again, it is a singular fact that, although we now know that the ametropias are produced by a change of position in the posterior pole of the eye, and although we know there is a peculiar and intimate connection between different varieties of the ametropias and astigmatism, yet nothing has been as yet advanced to explain the connection. To be more explicit, the smaller amounts of ametropia are, as a rule, complicated with astigmatism; while, with the greater, such is not the rule. An explanation for these phenomena, we think, is to be found short of the poles: we believe the same surface produces both; not always, nor necessarily to the entire amount in any given case; but the above connection, which has been dignified as the rule, can only meet with an adequate explanation when the two, astigmatism and ametropia, have their origin in the same surface and are produced by the same cause.

There are six varieties of astigmatism, four of which can be explained without supposing a change of curve; merely supposing a change in position of the posterior pole. Now, by this hypothesis, emmetropia with non-astigmatic vision exists when the two asymmetrical surfaces are at focal distances. But suppose the retina is separated, so that the vertical meridian occupies the place of the horizontal one, this latter is entirely out of focus, and we have produced the first Am. A little further extension of the ball, and we have M + Am. The other two may be produced in like manner by an approach of the retina to the cornea; first Ah and then H + Ah. It is worthy of remark that this hypothesis presumes the most distinct meridian to be the rule in all these cases, and departure from rule to be due to an exceptional cause. Our hypothesis does not ignore variation in the meridia, but makes it of secondary importance, and presumes that the variation of these is less in any given case, because two meridia are added together.

There are two other classes with their varieties—the mixed astigmatisms, M + Ah, and H + Am. With, however, two surfaces to account for these mixed astigmatisms, a certain amount of corneal curvature without deformity is presumable; but not so if it all is produced at the anterior pole. A natural division of the astigmatisms is made by some: those having a general cause and connected with a facial distortion, and those confined to the eye. Possibly it will be found that the former are more intimately connected with the change of the retinal plane, as occurs in the ametropias, while the others have the variation of curves in one or both poles of the eyé, as their most important factor.

Without enlarging—and these remarks are capable of greater extension—we turn to some phenomena that admit of no other explanation than a purely retinal seat. Sometimes in testing astigmatism two equally defined and very distinct lines are seen (we do not now refer to cases where there is but one meridian); these the corneal surface alone cannot possibly produce, and, moreover, the lens is excluded because they continue during accommodation. We believe that, of these two lines, the one in rule, i. e., either the vertical or horizontal one, as the case may be, is due to the cornea, while the other, the slanting one, is produced by the retina. This phenomenon of orientation of a meridian occurs generally in slight ametropias, and, consequently, in looking for a cause, that fact must be held in view. In slight ametropias, whether H or M, the plane of the retina is on a level with the optic papilla, but with the more extensive ones the plane of the retina at the macula is far removed. This answers as nothing else does; and we offer therefore the following explanation of the process occurring in the departures of the eyeball from the normal: The retina revolves in its plane around the eccentric optic nerve as a pivot, and consequently a meridian in focus does not remain either vertical or horizontal, but tilts.

An evanescent astigmatism, noticed by Dr. E. G. Loring, must have its seat solely at the back of the eye, because it occurs during diseases of the retina and choroid, and disappears when the disease passes away.

It is well known that all explanations which have designated the cornea as the seat of the astigmatism connected with strabismus, which passes away with the removal of the defect, have signally failed, because any explanation must consider that they are in rule. We do not claim originality in considering them as produced at the posterior pole, but we offer an explanation which we think has not before appeared, and has the advantage of an agreement with rule. For example, in internal strabismus, the internal muscle, pulling the cornea inward, stretches the external muscle which hugs the whole of the outside of the eye; the optic nerve, rigid and unyielding on the other side, forms at the posterior pole a vertical sulcus; and a vertical sulcus behind corresponds with a short vertical meridian in front, i. e., a meridian in rule.

It may be urged that, in any case, if the ophthalmometer shows that a spherical cornea is connected with non-astigmatic vision, our hypothesis is overturned. We reply, not so, unless enough spherical corneas are found to prove it the rule; as an exceptional cornea may very naturally be connected with an abnormal retina.

Note A.—An asymmetry of the cornea amounting to $\frac{1}{68}$ cyl. lens would only require an advance of .158 mm. of the vertical meridian of retina to produce E.

Note B.—A species of orientation in which the optic nerve revolves around the macula, instead of the macula around the nerve, can be seen by comparing the eyes of the sheep, cat, and man. This revolution is, moreover, connected in the two first-named animals with the well-known change of direction of the stenopacic pupils, while in man, where the optic papilla holds an intermediate position, the pupil is round; but the cornea, as I think I have shown, accomplishes by its asymmetrical nature the same connective agency, but with a better cosmetic effect.

LETTER FROM DR. G. HAY, OF BOSTON.

In conformity with the vote of the Ophthalmological Society, I beg leave to send to you the following, which I also send to Dr. Murdoch.

What I objected to was the view that an astigmatism, caused by an asymmetrical cornea, could be corrected by an asymmetrical retina.

According to my notion of the matter, if an astigmatism existed in consequence of an asymmetry of the cornea, then a pencil of rays proceeding from a *single point* of the object, say the point looked at, would, when arrived in the vitreous, be an astigmatic pencil.

From such an astigmatic pencil, which has no point-focus, the retina could not receive a point-impression, but only an impression extending over a certain surface, or a linear-shaped impression; and this, although the pencil proceeded from a single point of the object.

This being the case, even if the retina became asymmetrical, it could not reduce to a point-impression the surface-impression or line-impression made by the astigmatic pencil, that is, it could not correct the astigmatism. The impression on the retina would not be materially altered by the proposed change of shape of the retina.

This is the essence of what I intended to say at the meeting.

Very respectfully, G. Hay.

Dr. Noyes, Secretary American Ophthalmological Society.

DR. MURDOCH TO DR. HAY.

Dear Doctor: In reply to your much-esteemed favor of the 27th ult., I beg to say that we do not differ in that "a pencil of rays proceeding from a *single point* of the object, say the point looked at, would, when arrived in the vitreous, be an astigmatic pencil." Yet I cannot see that my position is altered by limiting the extent of surface, as you propose, for we are dealing with a pencil in either case, and, as long as we are so obliged to do, we obtain extension in two directions, and consequently have neither point nor line.

The most important position is your second, and there I entirely dissent from you, because a linear-shaped impression can only be formed by a purely cylindrical surface, and the cornea is a combination of sphere and cylinder, the former in much greater proportion (an asymmetrical cornea, you will grant me, differs from our sphero-cylindrical combinations only in having them both on one surface). Now, as, in the perfect camera, we oppose a convex sphere with a concave, and thereby correct spherical aberration, so I conceive that an analogous correction is effected in the eye by the opposition of a concave cylindrical element to the convex.

I am, etc., Russell Murdoch.

DR. HAY TO DR. MURDOCH.

Dear Doctor: I beg leave to acknowledge the favor of yours of the 3d ult. It is rather difficult to compare views by writing, but I should like to add a few words in explanation of my first note.

In the first place: I took up the case of a single pencil from a single point, thinking in that way to simplify the matter, because what we have to deal with is, I suppose, a collection of such pencils; one from each point of the object. And my idea was, that, if a proposed remedy would not correct a single astigmatic pencil, the same remedy would not correct a collection of such pencils.

Again: You write, a "linear-shaped impression can only be formed by a purely cylindrical surface, and the cornea is a combination of sphere and cylinder," etc. If we combine a plano-convex lens about ½ ¾, with a simple concave cylindrical —⅛, putting the two plane surfaces together, and placing the combination at about eight feet from an Argand gas-burner, burning rather low, we can get a linear-shaped illumination on a card placed at right angles to the course of the rays of light, the lenses being also similarly placed.

At one distance of the (white) card from the lenses we get a linear illumination in one direction; and at another distance of the card, a linear illumination at right angles to the first.

The linear character of the illumination may be made more marked, as follows: Let the light burn higher; put a screen before it, with a small hole, about 1½ or 2 lines in diameter, placed opposite the brightest part of the flame; bring up the lenses to about four feet from the light.

I think the experiment is quite *à propos* to the question at issue. I shall be glad to know how it appears to you. Yours, etc. G. HAY.

DR. MURDOCH TO DR. HAY.

DEAR DOCTOR: The combination you suggest is equivalent to two cylindrical lenses of unequal foci (½ ¾ C ∟ + ¼ ¼ C nearly) at right angles to each other.

The foci appear straight, because they fall on a plane surface, and are seen *en face;* but are arched, both in the direction of their long and short diameters: thus ⌣, ⌣.

I do not think that the experiment is appropriate, nor can I in its place suggest a spectral one, on account of the impossibility of grinding an asymmetrical surface which can oppose such a combination as that of the normal cornea. I can only suggest a subjective experiment, which to my mind is equally convincing: please make yourself slightly As., say Am. by $\frac{1}{42}$ cyl., and observe either Green's test-plates, or a candle-flame, placed at 20′, and ask yourself what surface will *passively* correct the As. Will it not be a similar one in kind to that which would *actively* correct the astigmatic rays before they enter the vitreous? To me the impression is that of an undulating surface, requiring an undulating or *cylindrical* surface to produce a uniformly distinct image, etc.

Yours, etc. RUSSELL MURDOCH.

AN ADDITIONAL METHOD FOR THE DETERMINATION OF ASTIGMATISM. By Dr. George Strawbridge, of Philadelphia.

I think it will be readily admitted that a simple, quick method for the determination of astigmatism is something very much to be wished for, but as yet not reached; and, with this end in view, I submit the following method, based on an experiment described in "Helmholtz's Optics," page 107, to wit:

"If the light from a gas-lamp, or from the sky, be allowed to pass through a small round opening in a screen, such a light will appear, to an eye not exactly accommodated for it, as a star, with light radiation proceeding from it in various directions; now, if a diaphragm is pushed slowly from the side so as to pass gradually in front of the eye, it will be observed that this 'light figure' begins to be *shaded*, and on the *same* side *from which the diaphragm was moved*, if the object is *farther* removed than the *point* for which the eye is *accommodated*, but from the *opposite* side, if the object is *nearer* than the point for which the eye is accommodated."

The reason of this will be readily seen by examination of the figure on the following page.

Rays of light proceeding from point a, after passing through lens b, will unite at point C, and on the retina $E\,E'$ a sharp image of the object will be thrown. But, suppose the eye to be hypermetropic, and the retina to be at $H\,H'$, then, instead of a sharp image, circles of dispersion will be formed of a diameter represented by $p\,q$. If in this circle we individualize the two points, $p\,q$, which are met by the light proceeding from a, as a result, the individual, under these cir-

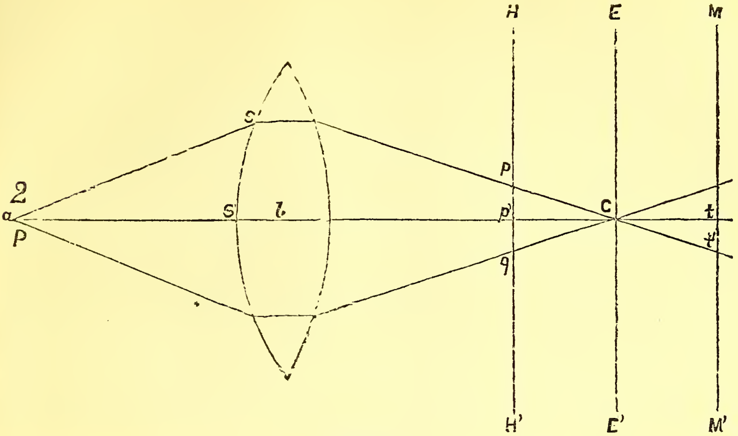


FIG. 1.

a, Light-point in space; *b*, Refractive media of eyeball; *C*, Focus of lens, *b*; *EE′*, Position of retina in emmetropic eye; *H H′*, Position of retina in hypermetropic eye; *M M′*, Position of retina in myopic eye.

cumstances, will consider that the upper point *p* in the retina represents the image of an object situated in the field of vision below the real light-point *a* (as *P* in diagram), and the lower point *q*, of an object *above* the real light-point (as *Q* in diagram); following the rule that images on the retina are inverted, and a lower-situated object corresponds to a higher-situated image on the retina.

Now, it will be readily understood that, by cutting off the rays of light as in the section *S S′* by a diaphragm, if the eye is *hypermetropic*, the semicircle of light-dispersion, *p p′*, on the retina *H H′*, will be intercepted; while, if the eye is *myopic*, the semicircle of light-dispersion, *t t′* on retina *M M′*, will be intercepted, and to the observer the effect will be, if hypermetropia exist, that the lower half of the light-circle at *a* will first vanish; while, if myopia exist, the upper half of the light-circle will first disappear as a consequence of the position of the images on the retina.

With these preliminary remarks, I proceed to describe the method of examination:

In the centre of a Bristol-board, a round aperture of thirteen millimetres diameter is cut, and at a distance from the aperture of six centimetres radiate bars, cut in the Bristol-board, having a length of nine centimetres, and width of five millimetres, and forming an angle with each other of ten degrees. Over this figure, white gauze paper is passed, and a lamp, placed behind, illuminates it in its entire extent.

The patient is placed at a distance of twenty feet from the figure, and requested to observe the round central opening, and to notice in what direction it is most elongated. This is readily determined by observing to which of the bars in the figure the light-prolongation most closely corresponds in its direction, and the result will be controlled, as to its accuracy, by also finding which of the bars are most distinctly seen. For example, in a case of myopic astigmatism in the vertical meridian, it would be found that the light-elongation would be upward and downward, and at the same time the vertical bar would be most distinctly seen.

By this procedure the *direction* of the meridian is discovered. The next step is to determine the *refraction* of the *meridian.*

To this end a diaphragm is advanced in the direction of the greatest elongation of the round light (suppose it to be vertical, and that the diaphragm moves from above downward), and the patient is requested to notice whether the upper half of the round light first disappears or the lower half, as the diaphragm moves downward; if the upper half is first gone, the meridian is shown to be so curved as to cause a *myopia* to *exist.*

While, if the lower half of the round light is the first to disappear, we conclude that a hypermetropia exists.

If the entire round light is found to disappear at once, it may be concluded that very little astigmatism exists.

The direction of the meridians being now known, as well as their refraction, whether normal or so curved as to cause a myopia or hypermetropia, the next step would be to determine exactly the *amount* of *abnormality.*

To this end we proceed with spherical glasses, determining the exact one necessary to see distinctly the proper bar, as in the method laid down by Snellen.

Advantages of this method:

1. Simplicity. The usual methods are, as a rule, so complicated that the patient often becomes confused in the ex-

amination, and an error can easily result; but to this new procedure no such objection can be made.

2. Accuracy, which results from the extreme delicacy of the test formed by illuminated bar.

3. The great saving of time, arising from the fact that the mode of examination can be conducted so much more quickly than by the ordinary methods.

4. This method allows of examination being made entirely independent of daylight, and so obviating any inconvenience arising from defective illumination found in cloudy weather, etc.

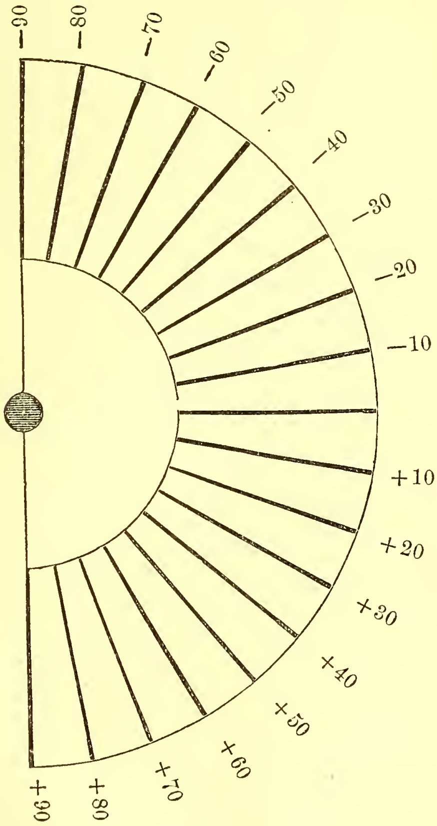


FIG 1

The above represents the figure used in this method of examination. The black circle and broad lines represent the central round aperture and bars, which are illuminated by a light placed behind. To Dr. John Green, of St. Louis, I am indebted for the idea of arranging the bars, as radii of a circle.

ON ASTIGMATISM AS AN ACTIVE CAUSE OF MYOPIA. By John Green, M. D., St. Louis, Mo.

In a paper published in the *American Journal of the Medical Sciences*, for January, 1867, I called attention to the fact that persons known to be myopes prove, upon careful examination, to be in a large proportion of cases also the subjects of astigmatism, a fact which suggested to me the possibility that, in many of these cases, the astigmatism stood to the myopia in the relation of cause to effect. I purpose now to study this relation in the light of recently-published statistics of astigmatism, taking for comparison my own series of cases, reported to the American Ophthalmological Society in June, 1867, and July, 1868,[1] and the much larger series published by Snellen, in connection with the Tenth Annual Report of the Netherlands Ophthalmic Hospital, in 1869.[2]

Snellen's tables comprise all the cases of astigmatism which occurred in the Utrecht clinic and consultation rooms during the years 1864–'68; 278 patients are enrolled, presenting 498 astigmatic eyes, 18 myopic, 8 hypermetropic, 9 emmetropic, and 23 blind or very imperfect eyes. My own cases, as published, include 48 patients with 84 astigmatic eyes, 4 myopic, 4 hypermetropic, 2 emmetropic, and two imperfect or blind eyes, making, with Snellen's cases, a total of 316 patients with 582 astigmatic eyes.

Of these 582 astigmatic eyes, in 318, or 54.6 per cent., the refractive anomaly was by excess (myopic astigmatism), and in 264, or 45.4 per cent. by deficiency (hypermetropic astigmatism), the percentage being almost exactly the same in the two series of observations. Both Snellen's and my own measurements were made, for the most part, without using atropia, and must be taken as showing the manifest rather than the total refractive defect; in many instances, therefore, we may assume that the accommodation was but partially relaxed, and that some cases really of Ah. or of Ahm. have been recorded as Am., or possibly even as M+Am. But, applying an approximate correction for this defect in the observations, we may still conclude, with a good degree of probability, that the cases of Am. and M+Am. are not less numerous than those of Ah. and H+Ah.

---

[1] Transactions of the American Ophthalmological Society, Fourth and Fifth Annual Meetings, Niagara, June, 1867, and Newport, July, 1868.

[2] Het tienjarig bestaan van het Nederlandsch gasthuis voor ooglijders. Met wetenschappelijke bijbladen. Utrecht, 1869. Also, Archiv. für Ophthalmologie, Band XV., Abtg. 2.

When we analyze the statistics of compound astigmatism we find the proportion of myopic to hypermetropic eyes much greater than in the aggregate of all the forms of astigmatism, while the source of error just noticed is almost if not quite eliminated. Thus we have from Snellen's tables, of—

M.+Am.	128 cases, or	61 per cent.
H.+Ah.	81 " "	39 " "
	209	100

From my own list we have, of—

M.+Am.	39 cases, or	53 per cent.
H.+Ah.	33 " "	47 " "
	72	100

Combining the two tables we have, of—

M.+Am.	167 cases, or	59.4 per cent.
H.+Ah.	114 " "	40.6 " "
	281	100

These data would seem to afford a fair basis for the assumption that there is more than an accidental connection between myopia and astigmatism. That such connection should exist is, moreover, not only quite probable, but the opposite condition would seem to be, on the whole, improbable.

Admitting, with Donders, that hypermetropia is the expression of an inherited conformation of the eye, while myopia is ordinarily the result of a pathological distention of the globe, we are irresistibly led to the conclusion that most of the cases of M.+Am. may have been originally cases of simple or possibly of mixed astigmatism. So also some of the cases of Am. and Amh. may be only instances of myopia superinduced upon Ahm. or Ah.[1]

To deny this is to assume that astigmatism when conjoined with myopia is to be considered as acquired, while we regard simple astigmatism and astigmatism conjoined with hypermetropia as congenital.

It only remains to point out how astigmatism can act as a cause of myopia, and this seems sufficiently obvious. The effect of reading and study of books, in originating as well as in aggravating the grade of myopia, has been clearly pointed out by Cohn, of Breslau, who has called attention to two very important elements of mischief in schools, viz., insufficient or badly-arranged illumination, and bad construction of desks, compelling the scholars to bend their heads over their books.

Exactly analogous to the effect of insufficient light, in compelling the child to hold his book nearer than would otherwise be necessary, is the operation of any other cause which tends to impair the distinctness of vision. Such a cause, and a most efficient one, we have in astigmatism, and we need but reflect upon the amount and kind of bookwork which is demanded of our school-children, to find in even moderate grades of astigmatism an almost irresistible incentive to read under high degrees of convergence and with strong exercise of the accommodation. In astigmatism the injurious effect of insufficient illumination, too, must be far greater than in emmetropia, inasmuch as the normal compensation in the enlargement of the pupils is rendered unavailing through the consequent diminution in the distinctness of the retinal images.

Researches undertaken upon large numbers of myopes, with a view to establishing the degree of frequency with which astigmatism is present as a complication, are, so far as I know, still wanting.

---

[1] The recent careful investigations of F. Erismann, upon 4,358 school-children of St. Petersburg, seem to prove, beyond a doubt, that large numbers of eyes originally hypermetropic pass through the stage of emmetropia, finally to become myopic—and this as a direct result of long-continued straining of the accommodation and convergence in study. (Archiv. für Ophthalmologie, xvii., i.)

REMARKS ON CATARACT. By Edward G Loring, M. D., New York.

Mr. President: As you are well aware, it has long been recognized that astigmatism often occurs as a disturbing element in the vision of patients who have been operated upon for cataract. Thus, Dr. Knapp, in Graefe's *Archives* for 1867, observes, that "we should not neglect to test eyes, which have been operated on for cataract, with cylindric glasses, to see if vision is not thereby improved. This is found to be the case in a marked degree, where the result has been a good one, in about one-fourth of the cases. Thus, I have found, where V. = $\frac{1}{4}$, corrected it will be $\frac{1}{2}$, and V. $\frac{1}{3}$ will become $\frac{2}{3}$, and so on."

But notwithstanding this knowledge of its existence, very little has been done by the majority of operators in determining the degree of the error in refraction when making out their statistics of vision, and still less has the attempt been made to remedy the defect by prescribing suitable glasses.

This latter is no doubt due to the fact that the necessary sphero-cylindric glass is so heavy and of so awkward a shape as only to be worn with great discomfort to the patient. Thus, if we wished to give a spherical glass, for example + $\frac{1}{4}$ combined with a cylindric glass, the spherical surface, inasmuch as it would have to be put all on one side, would have to be ground on a radius of two inches. This degree of curvature would, in order to fill the eye of the spectacle-frame, require the glass to be very thick in the centre, the apex of which would consequently project a good deal from the plane of the rim of the spectacle, while the slight curvature of the cylindric surface would hardly project at all. Such a glass as this is necessarily very heavy, clumsy, and uncomfortable.

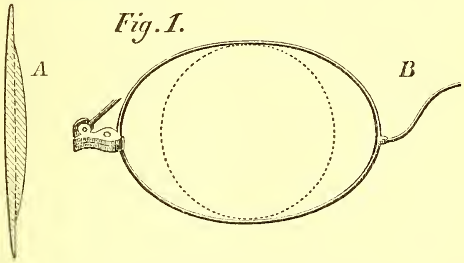
With the hope of remedying these objections, so as to allow us to give astigmatic glasses to cataract-patients, I have contrived the glass which I now present to the Society, and which is made in the following manner:

A simple cylindric glass of the required strength is first set in the spectacle-frame in the usual way, the axis of the glass of course running in the required direction. A thin plano-convex glass is then ground, and, taking advantage of the fact that lenses can be cemented together by Canada balsam, this is firmly fixed by its plane surface to the back, or plane surface of the cylindric glass.

As the diameter of the plano-convex is made only equal to the vertical diameter of the spectacle-frame, and not to the longitudinal one, it follows that a large quantity of glass is thus dispensed with, and the weight of the glass is thereby much lessened, the two combined lenses being in fact, when nicely made, only one-fourth of the common spherical cataract-glass as found in the shops.

In the figure, *A* gives a longitudinal section of the glass, the dotted line marking the line of union between the two lenses, while *B* shows the front view of the glass as it appears in the frame, the dotted line here showing the circumference of the plano-convex glass. As you will observe, the edge of the convex lens is so delicately ground and so perfectly fitted to the cylindric glass that the point of union is barely perceptible when the glass is worn, and the peculiarity of its construction would escape the notice of any but a very observant eye.

Fig. 1.



The pair which I now offer as a sample has a spherical surface of $+\frac{1}{2}$ (really equal to a biconvex $+\frac{1}{4}$), and a cylindric surface $+\frac{1}{12}$ C, the patient being astigmatic to that degree in the vertical meridian. With the best correction with spherical glasses, vision equalled $\frac{1}{4}$; with this glass it rose to $\frac{1}{2}$.

The chief objection which would be raised against glasses made in this manner would, in all probability, be on account of their liability to come apart. Whether this is a valid objection remains to be proved. I would say that this pair has been in constant use for four months, and in that time they have been dropped twice; once in a crowd, from which they were only rescued after the frames had been considerably bent. They certainly show no signs of separation between the two lenses, and we know that the lenses of telescopes and opera-glasses are subjected, oftentimes for years, to the extremes of temperature and hard usage, without showing such a tendency, and, even if the glasses should occasionally separate, it is certainly a simple matter to recement them.

This slight inconvenience would be more than compensated, it seems to me, by the increased amount of vision gained, especially when, as in the present case, it is doubled.

In this connection I would remark that it seems to me that a want of uniformity now exists among operators in regard to testing the vision of cataract-patients, which has a tendency, to say the least, to create confusion not only as to the results of different operators which is of comparatively small importance, but also as to the merits of the method of operating itself, which is of vast importance.

It is almost universally considered now, after the so-called peripheric linear has been in vogue for the past eight years, and after it has been consequently thoroughly tried, that it is far superior to the old flap-operation, and this opinion purports to be founded—not as many medical opinions are—on unsupported convictions of its great originator, and a few of his most skilful disciples, but on carefully-prepared statistics, which, as they are based on mathematical principles, are of almost mathematical exactness. It is alleged that, as the basis upon which the statistics for both operations were compiled was the same, namely, Snellen's method, it follows that the comparison must be a just one, and, as the peripheric linear yielded more favorable results, this was the better operation.

From this opinion, prevalent as it is, we demur, and believe that, although the method of testing was the same, yet the standard used was different, and that, consequently, the conclusions drawn are not only unreliable but even erroneous, and that, so far as statistics go, it is at least still a question whether the old flap, and not the new peripheric linear, does not give the best results.

To show that this is the case, reference must be made to the statistics themselves.

In 1863 Graefe published the results of 1,500 cases of flap-extraction.[1] Out of these he got 65 per cent. of immediate good results, with 15 per cent. additional after a secondary operation, making 80 per cent. as a grand total of perfect success. In these cases, "vision of at least $\frac{1}{4}$" is taken as the standard necessary for a good result. In patients over seventy-five years, however, $V=\frac{1}{6}$ is allowed. There was a total loss of from 5 to 8 per cent.

In a later paper, however,[2] Graefe gives another series of cases, in which he gets 84 per cent. of perfect results, 11 per cent. of half successes, and a total loss of 5 per cent., and he then states that, in his private practice, the results were even better than this, namely, 91 per cent. of perfect results, 6 per cent. of half successes, and only 3 per cent. of absolute loss. Ninety-one per cent. of patients, with vision $\frac{1}{4}$ and over, and only 3 per cent. of total loss, is a result which we venture to say has never been equalled by any other method.

If we now turn to the peripheric linear, we find at the outset that "Graefe, as Dr. Norris says,[3] has not given us so extended and full an analytical report of his cases as would be desirable," but he did publish 300 cases (*Archiv.*, xii., part i., p. 151), in which he got 90 per cent. of perfect immediate good results. But here, instead of taking vision $\frac{1}{4}$ as a standard, he took $\frac{1}{6}$, and we have no means of knowing how many cases were included between $V = \frac{1}{4}$ and $V\ \frac{1}{6}$. But, if, for the sake of calculation, we take the difference between $\frac{1}{4}$ and $\frac{1}{6}$, we must then subtract 9 per cent., which would leave 81 per cent. of cases with vision $\frac{1}{4}$. Graefe then goes on to state that, out of the 10 per cent. which comprises total failures and imperfect successes, enough would have been benefited by secondary operations to have given a grand total of 94 per cent. of perfect results. Admitting that this "would have been" the case, we must still take, in order to make the comparison a just one, 9 per cent. away, which would leave a grand total of 84.6 per cent. of perfect results against 84 of the second, and 91 of the third series of flap-operations. Thus we see that the balance swings, if any thing, a little in favor of the flap-operation. Whether this may be accounted for in the difference between strictly private and a mixed series of patients, it is hard to say. But what is plain is, that, even in Graefe's hands, the results of each method are so nearly equal, that it is still an open question which is the better; or, to say the least, there is no sufficient cause, so far as statistics are concerned, for the now almost universal belief that the linear is so much superior to the flap.

---

[1] Zehender, Klin. Monatsblät., p. 146, 1863.

[2] Archiv. für Ophthal., vol. xi., part iii., p. 7, 1865.

[3] Hay's Journal, January, 1871, p. 243.

Were this prevalent opinion, however, founded upon Graefe's results alone, little more would need to be said; but, inasmuch as it has apparently been confirmed by those of others hardly less skilful than he, it may not be without interest to look at the statistics of these operators, scanty though they be, which have gone so far to produce this general opinion.

Thus Dr. Knapp, who is an ardent supporter of the new operation, has published three series of cases of 100 each, which are exceedingly interesting and instructive on account of their fulness of detail in regard to the amount of vision obtained.

In his first series (*Archiv.*, xiii., vol. i., p. 120), Dr. Knapp claims 62 per cent. perfect results. Here he uses, however, vision $\frac{1}{6}$ as a standard of success. If we apply that used in the flap, we find, on looking at the table, that out of the 100 cases he got only 39 perfect results, against Graefe's first and worst series of flaps, which gave 65 per cent. of *immediate* perfect successes; $V = \frac{1}{4}$.

Dr. Knapp remarks that among these cases there is 14 per cent. in which vision ranges from $\frac{1}{40}$ to $\frac{1}{200}$, and which are capable of being improved by a secondary operation. Admitting that one-half are so improved thereby as to obtain vision equal to $\frac{1}{4}$, and this is a large proportion, we then get as a final result $39+7=46$ with vision $\frac{1}{4}$ and over.

In making out his second series (*Archiv.*, xiv., vol. i., p. 316) Dr. Knapp says that "he, as Graefe, and others have done," divides his cases into three classes, which, with their respective numbers in each are, as follows:

Failures 2.
Imperfect results ($V=\frac{1}{12} - \frac{1}{100}$) 12.
Perfect " ($V=\frac{1}{2} - \frac{1}{10}$) 86.

It will be seen from this that Dr. Knapp claims 86 cases out of the 100 of immediate good results; but here another change takes place, and, instead of taking V $\frac{1}{4}$ or even $\frac{1}{6}$ as a standard, he takes $\frac{1}{10}$, and apparently on the authority of Graefe. This may be the case, but I can nowhere find it stated in Graefe's writings that he has ever used a scale of vision lower than $\frac{1}{6}$ as a perfect result, though it is undoubtedly true, as will be seen a little later, that others have done so, and it strikes me as manifestly unjust and unscientific to maintain the superiority of one operation by statistics in which the standard of excellence used is *two and one-half times less* than in the other.

If we look at the table of specific results from which the above classification was made, we see that, out of the 100 cases, there are only 40 in which the vision is $\frac{1}{4}$ and over. That is to say, only 40 per cent. of immediate successes according to the scale for the flap-operation.

We also see that there are 12 imperfect results. Now, supposing we admit with Dr. Knapp that one-half of these imperfect results can be made perfect ones, and that, in all of these, vision can be made, not, as he says, $\frac{1}{10}$, but even $\frac{1}{4}$, and supposing we add these cases to the 40 already perfect, we get as a final result $40+6=46$ cases out of the 100 with $\frac{1}{4}$ and over.

With $V = \frac{1}{10}$ Dr. Knapp makes the final result 93 successes.

In his third series Dr. Knapp has (*Knapp's Archiv.*, vol. i., p. 130):

Failures	3
Imperfect ($S < \frac{1}{10}$)	15
Perfect ($S > \frac{1}{11}$)	82

By looking at the table of specific results, we find 50 cases of immediate good results, $V = \frac{1}{4}$ and over. Admitting with Dr. Knapp that 9 out of the 15 imperfect could be made perfect, and allowing to these cases, as before, $V = \frac{1}{4}$, not $\frac{1}{10}$, which is all that Dr. Knapp claims, we get as a final result $50+9=59$ cases with $V \frac{1}{4}$ and over.

Making, now, a comparison between the final results of Dr. Knapp's series of cases by peripheric linear and Graefe's by the flap, we have, arranged in tabular form, something like the following:

Knapp Linear.		Graefe Flap.	
1st series	46	against	80
2d "	46	"	84
3d "	59	"	91

This averaged gives 35 *per cent.* in favor of the flap with vision $\frac{1}{4}$ taken as a standard in each case.

It may be objected that in the above calculation we have taken even a higher scale than did Graefe himself in applying vision $\frac{1}{4}$ to all cases, inasmuch as Graefe made an exception of such as were over seventy-five years of age, reckoning in these cases $V \frac{1}{6}$ as a perfect result.

As an offset to this, it must be remembered that we have allowed to Dr. Knapp 8 cases in each 100 with $V \frac{1}{4}$, when in the first series $V \frac{1}{6}$, and in the remaining two only $V \frac{1}{10}$, was claimed.

It might also be objected to as hardly fair to contrast any other operator, however skilful, with the great father of modern ophthalmology; and the above figures would go a good way toward making such an objection valid, especially as Graefe was working under the disadvantage of what is supposed to be an inferior operation. This impression will, however, be corrected, to a degree at least, when we call to mind that it has always been the custom, especially latterly, to look upon Graefe as a great medical philosopher rather than a skilful and delicate operator, though it would certainly strike one, judging simply from the results which he obtained, that he was in this, as in all other clinical branches of our specialty, immensely superior to any one of this or any other generation.

Becker published (*Zehender*, vol. v., p. 279, 1867) the statistics of 217 cases (150 operated upon by Prof. Arlt), in which V $\frac{1}{10}$ was also taken as a perfect result; inasmuch, however, as no specific details are given as to vision, no satisfactory comparison can be made from them, except that the final result obtained was only 83 per cent. with V $\frac{1}{10}$, and over.

Dr. Derby, of Boston, a warm advocate of the new operation, has given, in an analysis (*Boston Medical and Surgical Journal*, June 8, 1871) of 61 cases of linear extraction, a tabular statement of the vision of 49 patients. Dr. Derby also reckons V $\frac{1}{10}$ and over as a perfect result, and sums up the cases as follows:

Failures	3
Partial success (V $\frac{1}{11}$ to $\frac{1}{30}$)	6
Entire success (V $\frac{2}{3}$ to $\frac{1}{10}$)	43

If, however, we reckon an "entire success" $\frac{1}{4}$ instead of $\frac{1}{10}$, we find, by referring to the table, that there are only 19 such cases, instead of 49.

If of the 9 additional unrecorded cases we assume that 5 will have vision of $\frac{1}{4}$ and over, we get as a final result 24 cases of perfect result out of 61, or 39 per cent.

There are, indeed, other statistics by different operators, all of which, however, are compiled with so little exactness, or founded upon such various and indefinite scales of measurement, as to be of little value for the purposes of comparison. Still, those which have been cited here are enough to show that the want of uniformity in the standard is a serious embarrassment in our making a just comparison, not only between the results obtained by various operators, but even of the true merits of the two methods, and this is the object which we had in view.

And in this connection I would say that I can easily understand how the younger and rising school of ophthalmologists, after having gained their experience in the old method, with all the numerous mistakes and failures incident to beginners in this difficult and exacting technic, should now obtain, after they have become proficients, better results with the linear than they did at the outset with the flap. For it is certainly easier for a practised hand to change slightly the method of operating, than for a novice to learn how to operate.

What we should like to see done would be, for those who are skilled in both methods, and who have plenty of material, to try them side by side under the same influences and with the same tests. It is only in this way that the two operations can be justly compared. But, if these conditions are too hard to fulfil, we might at any rate expect that the advocates of each method might conform to the very simple condition of using the same standard of measurement, be this what it may.

It may be said that the one originally taken by Graefe, namely, $\frac{1}{4}$, is too high, and that it was probably for this reason that he himself changed it in the linear method. Admitting that this is true, and that V $\frac{1}{6}$ is nearer the mark, the question at once arises, What are we to do, for the sake of study and comparison, with the immense number of cases carefully recorded by Graefe and tabulated under the scale of $V = \frac{1}{4}$ —cases which, from their great number and from the vast amount of instruction which they embody, form one of the most brilliant pages in the whole annals of modern ophthalmology? And, if, to suit the progressive spirit of the age in its craving for "perfect results," we go successively from $\frac{1}{4}$ to $\frac{1}{6}$, and to $\frac{1}{10}$, where, may we ask, shall the end be?

I would say, further, Mr. President, that these remarks are not in any way meant as a criticism on either operation. Had they been so, reference would have been made to many things which have not even been mentioned, and certainly to the change instituted by Graefe himself, from a wound which was entirely in the sclera to one which is two-thirds or more in the cornea, and from the slight arc latterly sanctioned by Graefe to a gradual increase in the curvature of the section, till, in the hands of many operators, both in Europe and this country, the only appreciable difference between the new operation and the flap with a concurrent iridectomy is the difference between the old and the new knife.

The discussion of these points, as well as the final decision as to the merits of the respective operations, I feel had much better be left to those of my colleagues whose experience is richer and whose judgment riper than my own.

AN APPARATUS FOR TESTING THE PERCEPTION OF COLOR. By Henry D. Noyes, M. D., New York.

The examination of a patient's ability to discriminate colors I have found to be a time-consuming proceeding, and have been at a loss how to register the results of the examination in a graphic and satisfactory manner. To obviate in some measure these difficulties, and because I appreciate the importance of making these investigations, I have adopted some simple contrivances which I beg leave to describe.

I paste upon a circular piece of card-board the slips of colored paper which I use as tests. They are put on in sectors of the circle, and may be as numerous as is thought needful. I have divided the circle into ten sectors, and have put on it two shades of five colors, viz., red, blue, yellow, green, and purple.

This disk is covered by another whose surface is black, and whose diameter is half an inch smaller. In this top disk a notch is cut, corresponding to the size of one of the colored sectors of the other disk.

The covering disk or screen is attached to a handle, and is pierced through its centre by a pivot on which the colored disk is to rotate. The latter, moreover, has broad notches cut into its rim, like teeth in a cog-wheel, which correspond in number to the colored sectors, and are so placed as to give ready hold for the forefinger or thumb to rotate it. The whole affair looks something like a palm-leaf fan. In examining a patient, he is placed before a black-board and told to fix one eye upon a distinct mark near its centre. The color-test is presented to his view in different parts of the field just as is done usually with a bit of white chalk. The disk is held in one hand, and by the finger or thumb of the same hand rotating the outer disk a succession of colors is presented to the patient's notice. To register the findings of the examination upon the black-board, it is needful simply to select crayons corresponding in tint to the colors employed, and, with the proper chalk, mark upon the board the place where each color is perceived. The usual way of getting the visual field with white chalk is thus applied to color-tests. The method being simply to employ colored chalk in one hand to mark upon the board the spots where the colors successively exposed to his view upon the disk in the other hand are recognized. When the examination is complete, a number of colored tracings are upon the black-board, which may be transferred to a note-book, on a reduced scale, with precisely the same crayons.

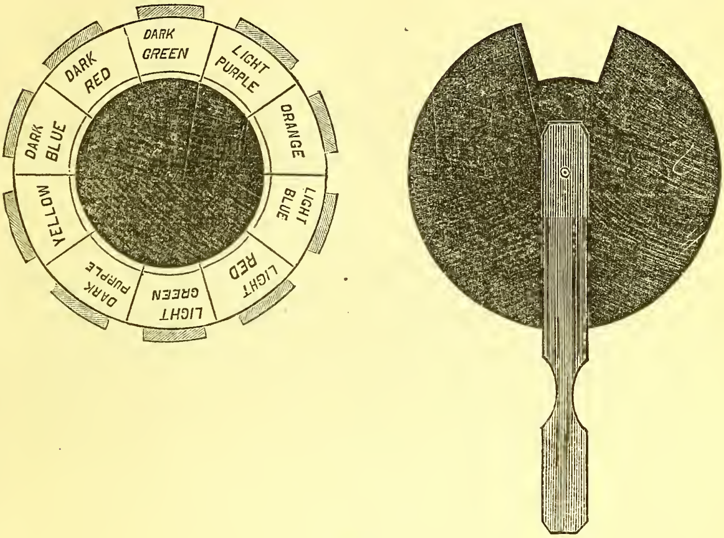


Fig. 1.

DESCRIPTION OF A JAEGER OPHTHALMOSCOPE, AS MODIFIED. By Dr. GEORGE STRAWBRIDGE, Philadelphia.

THE apparatus can briefly be described as follows: The body of the instrument consists of a short cylindrical tube fitted into a ring, and so arranged as to permit of rotation on its axis. At its anterior extremity, it is so cut away as to cause its anterior surface to form with the cylindrical axis an angle of 60°; on the anterior border of the tube are found two notches made to hold the arms of the reflector, and on the side of the notch is placed a small spring for fixation of the reflector. The longest side-wall of the cylinder has a length of one inch, while its shortest side has a length of two lines. The posterior end of the tube is closed by a diaphragm, having a central opening of three lines diameter; and on its posterior surface are fastened a spring-catch and axle for holding a disk in position and permitting of its rotation. To the ring, grasping the cylinder, is fitted a handle made to close in itself (as the blade and handle of a knife), and so economizing room. The ophthalmoscope contains a "strong light" and "soft light" reflector. The first is a concave glass reflector of seven inches focus. The latter consists of three plane, parallel, transparent, thin glass plates, fitted in a metal frame and so fastened that they can be easily taken apart and cleaned; between each of these glass plates is placed a thin metal ring for the purpose of preserving an intermediate thin layer of air. The apparatus contains, in addition, a convex lens of two and a half inches focal distance, fastened in a ring for convenience in holding; and, finally, twenty correction-glasses placed in three metal disks; each disk having seven openings for this purpose' The first disk, which may be called the "the working-disk,' is divided as follows: First, an opening for observation of the eye with the reflector alone. Secondly, a convex eight glass for examination of the inverted image; and, finally, concave glasses Nos. 10, 8, 6, 4, 3, for examination of the erect image. For an ordinary examination this disk alone will generally suffice.

The second disk contains convex glasses Nos. 48, 30, 24, 16, 12, 10, 7. The third disk contains concave glasses Nos. 30, 24, 16, 12, 7, 5, 2; and it is believed that this collection of glasses will be found sufficient to determine the greater number of refraction anomalies.

The disk rotates behind the opening in the diaphragm, and by means of the spring-catch each glass as it rotates is caused to stop exactly behind the centre of the opening, and at the same time the arrangement allows of the disk being quickly removed and another substituted—on the same principle as Dr. E. G. Loring, of New York, has made use of in the construction of his ophthalmoscope, and from whom the idea was derived. The entire apparatus is contained in a box 4⅜ inches long and 1⅞ inch wide.

The chief advantages of this form of ophthalmoscope consist in the fact that it has the "weak light" reflector as well as the "strong light" reflector. Also, that these reflectors have two motions, one on their own axis and one on the axis of the cylinder, and so permit of great variety of position, while at the same time the correction-glasses remain stationary, thus avoiding any prismatic effect from the correction-glass. Finally, the arrangement of the correction-glasses in a disk avoids the trouble which is occasioned by adjusting each glass separately, and at the same time the collection of glasses is sufficiently large to admit of the determination of a refraction anomaly in a case where a box of glasses is not attainable.

GUNSHOT-WOUND OF THE BRAIN, FOLLOWED BY FUNGUS CEREBRI, AND RECOVERY WITH HEMIOPSIA.[1] By W. W. KEEN, M. D., and WILLIAM THOMSON, M. D.

CASE I.—PATRICK HUGHES, late private of Company K, Fourth Regiment, New York Volunteers; born in 1839, in Ireland; puddler both before and since enlistment; wounded at Antietam, September 17, 1862. Wound of entrance in the middle line, one and a quarter inch above external occipital protuberance—a small, depressed wound; wound of exit two by two and a half inches, its centre being two inches to the left of middle line, and three inches above wound of entrance. He fell, did not lose consciousness, but, blinded by blood, crept toward the enemy till warned by his comrades, when he crawled behind the ranks, and was carried, when faint, to an old barn, where he remained nine days. While here, his eyesight, he thinks, was poor. He was then taken to Mount Pleasant Hospital, Washington, D. C., where he lost his consciousness, and was more or less paralyzed in both right arm and right leg—whether slowly or suddenly, and whether it extended to the face, he does not remember. The paralysis and unconsciousness lasted some two or three months. He remembers having had fungus cerebri as large as his fist, which was shaved off some five or six times. When he tried to think, he often used to become almost "out of his head." His memory was so bad that, between calling the doctor and his turning to hear the question, he would forget what he desired to say. He had no aphasia. In four and a half months he was able to come to Philadelphia. In walking he was very giddy; noise and laughter used to hurt him badly. His mental and physical power gradually grew better, and in one year his paralysis had almost disappeared.

---

[1] Extracted from the Photographic Review of Medicine and Surgery for February, 1871.

Present Condition, December 20, 1870.—His memory is quite good, but by no means so good as before the injury. He is rather easily bothered and confused, and more irritable than formerly. The sight of his right eye, he thinks, is poor. Whiskey affects him as usual. Sexual power undiminished. He has no paralysis. The wound of entrance (see photograph—the head was shaved in order to have the photograph taken) is marked by a slight depression in the bone, the wound of exit by a hollow two and a half by two inches, and one inch deep. No bone has closed this opening, but the scalp and hair dip down into the hollow. The arterial pulsations are barely perceptible. When recumbent, the hollow is gradually obliterated and replaced in about one minute by a rounded protuberance. To prevent pain during this change, he supports the parts with his hand. When he coughs, even with moderate force, the depressed scalp instantly bulges up in a cone, which nearly reaches the general level of the skull and obliterates the depression, and then as suddenly subsides.

The eyes, upon examination, present the following conditions: There is no ptosis on either side; entire mobility of the eyes under direction of the will; both pupils normal in size, and responsive to light. Upon the left cornea is to be seen a slight leucoma, the result of a burn from a piece of metal, received two years since. In all other respects both eyes are, in appearance, perfectly normal. Refraction of each eye is found to be emmetropic. The acuteness of vision is for the right $\frac{1}{1}$, and for the left $\frac{1}{1.5}$; the slight impairment of vision being due to the result of the burn, which caused not only slight opacity of the cornea, but also irregular astigmatism. The power of accommodation is for each eye $\frac{1}{4.5}$. There is no diplopia, and no insufficiency of either internus.

Upon testing the field of vision, it is found to be divided for each eye by a line passing through its centre, in the vertical direction—total blindness existing to the right, and perfect vision to the left, of this line. When, for example, the right eye is fixed upon a point of light eight feet distant, a second point of light is lost to view when it is moved one inch and a half toward the right in a horizontal line; and precisely the same condition exists for the left eye—i. e., the light is lost one inch and a half to the right of the median line. With the *right* eye it is not possible to determine the spot of Mariotte —that is, the blind spot in the field corresponding to the entrance of the optic nerve (*see* the diagram, p. 29)—since the insensitiveness of the retina in that eye commences at the inner margin of the macula lutea, and extends to the entire inner half of the retina. With the *left* eye, that portion of the retina between the optic-nerve entrance and the macula is found normal in sensitiveness; since, when at four feet the left eye is fixed upon a point of light, a second light is clearly perceived as it is moved toward the left until it has reached a point about nine inches to the left, where it is lost, to reappear at a point about thirteen inches from the first light. Beyond this point the field has its normal extent.

By ophthalmoscopic examination no pathological appearances whatever could be observed, either in the retina or at either optic papilla, beyond the distortion caused in the left eye by the astigmatism, probably of traumatic origin, as mentioned above.

Remarks.—I. This case is briefly referred to in Circular No. 6, S. G. O., 1865, at the bottom of page 15; and Dr. Otis writes us that it will be fully related in the first volume of the "Surgical History of the War," with the chromo-lithograph of the fungus cerebri. As it must first be presented to Congress and published by the Department, no opportunity was presented us of correcting the history by these notes. The history here presented, therefore, as derived from the patient, must be taken with some caution, since the wound has so severely injured his cerebrum. On all points, however, he gave very clear statements.

II. The complete recovery from paralysis (as evinced by his subseqent severe labor), and the almost entire restoration of his mental faculties, are remarkable, especially in view of the probable deep lesion of the brain, both by the primary injury and the subsequent fungus cerebri.

III. The astonishing and rapid changes in the state of the cranial contents, due to any change in position, to coughing, etc., as evinced by the effacement of the depression at the wound of exit, are worthy of note. Whether due to a flow of cerebro-spinal fluid (which would be the principal agent in a change of posture), or to venous congestion (as in coughing), the case shows that our attention has been far too slightly fixed on the medical bearings of such facts in all cases of severe cough, and on their surgical bearings in operations for cataract, etc., during the existence of bronchitis.

IV. The light thrown on the probable anatomy of the optic commissure is also worth our notice.

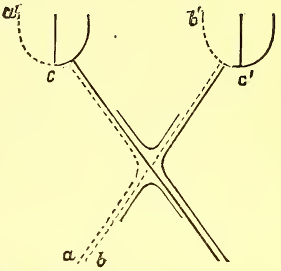


Diagram of the optic commissure and the two retinæ.—*a*, *b*, the fibres of the left optic tract supplying, respectively, the left halves of the two retinæ *a' b'* ; *c*, *c'*, the maculæ luteæ.

The inter-retinal and inter-cerebral fibres are merely indicated.

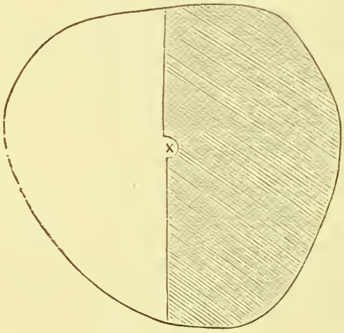
Wollaston (Phil. Trans., 1824, p. 222), reasoning from two attacks of transient hemiopsia, occurring in himself, and other cases in friends, appears to have been the first to point out the semi-decussation of the optic nerves at the chiasm. Longet ("Traité de Phys.," 2d ed., ii., 476) seems to assent to the explanation, though he refers to cases of perfect sight in which, it is asserted, no chiasm existed; and in his "Traité d'Anat. et de Phys. du Syst. Nerv.," p. 666, he gives cases of perfect sight in both eyes, in spite of unilateral cerebral atrophy or traumatic lesion. Von Graefe (*Archiv.*, ii., 286) assents cordially to Wollaston's view, admitting that he proposes nothing new, but that it is far too little known.

Hubert Airy (On a Distinct Form of Transient Hemiopsia, Proc. Roy. Soc., February 17, 1870, in *Nature*, i., 444), after a careful examination of preceding writers, also supports it; and the experiments of Laborde and Leven (*Med. Gaz.*, November 5, 1870; from *Gaz. Méd. de Paris*), who found atrophy of the right optic nerve following the removal of the superficial right cerebral convolutions, and without any apparent irritative processes, would also point in the same direction.

In our own case the point to which we desire to call special attention is the rigid optical examination of the region between the porus opticus and the macula lutea. The semi-decussation of the nerves at the chiasm being admitted, it would naturally be supposed that the fibres a from the left tract would supply the left retina from the porus opticus toward a'; but our examination shows that it supplies *less* than this, viz., only that part of the retina from c to a'; while in the right eye the fibres b, instead of supplying the retina from the porus opticus to b', supply *more* than this, viz., that part of the retina from c' to b'. In other words, the fibres a and b of the left optic tract supply mathematically the left halves of the two retinæ from c to a' and c' to b', and the right tract the right halves.

V. As to the cerebral seat of the sense of vision, the amount and depth of the injury to the brain are too uncertain, perhaps, to warrant us in venturing on any speculations as to its locality.

Note to Case I.—These examinations were made in the usual manner, with a black-board and chalk, with two bright points of light, and with Förster's apparatus. The man was intelligent, possessed normal acuteness of vision, and became well trained in the methods of investigation employed, and these considerations give interest to the fact that, *at the point of fixation*, the vertical line which bisected the field seemed to deviate slightly toward the defective side. Above and below a horizontal line through the field at the point of fixation, the



Field of right eye.

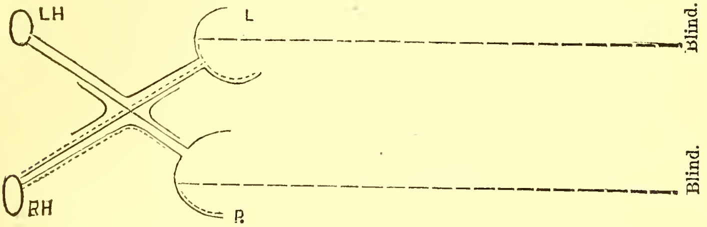
limitation was strictly vertical, while in the horizontal line, at a distance of eight feet, a moving light could be carried for one and a half inch from the fixed one before being lost to view. Due allowance must be made for the possible eccentric fixation of the patient, and for his having inadvertently *followed* the moving light for this short distance.

Case II.—Reported to the Society by Dr. W. Thomson. Joseph Rowan, aged fifty-five, disabled by partial paralysis of motion of left side, states that he had a sunstroke seven years since, and a second one three years ago. His hemiplegia is now of two years' standing. Sensation on both sides is unimpaired.

Vision. R. $\frac{1}{4}$ L. $\frac{1}{2}$ Refraction Hy. $=\frac{1}{20}$ with $+\frac{1}{20}$ Vision. R. $\frac{1}{3}$ L. $\frac{1}{2}$ $A = \frac{1}{14}$

No ptosis, nor muscular insufficiency. Right pupil slightly larger than left. By ophthalmoscope, both eyes are normal in appearance.

The field of vision of each eye is bisected by a vertical line, to the left of which there is entire blindness, as tested by the black-board and chalk, as well as by two bright points of light.



No effort was made in this instance to ascertain whether the field was limited strictly by the vertical line at the point of fixation, since the intellection of this patient seemed so far impaired as to render it impossible for him to sustain the mental effort requisite to complete so refined a subjective examination.[1]

---

[1] Confirmed by Dr. C. A. McCall, U. S. A., who had him in charge at the time.

DETACHMENT OF THE RETINA, WITH LACERATION AT THE MACULA LUTEA. By Henry D. Noyes, M. D., New York.

Miss Carrie S., aged thirteen, New York, was struck in the left eye, three years ago, by a cork which popped from an ale-bottle; sight was lost immediately. When the stinging pain of the blow subsided, she experienced no suffering, and no inflammation ensued. The eye has remained in the same condition, with the exception of slight divergence. There is now obtuse perception of light; pupil contracts as usual. After using atropia, ophthalmoscopic examination showed the following appearances:

The optic nerve clearly defined and normal. The retina lifted up by a stratum of fluid, which is most abundant below and to the outer side. In every part of the fundus this effusion can be discerned, but nowhere is it in considerable quantity. It is almost transparent. The detached retina can be sharply defined in the upright image by aid of a convex 10 glass, the observer being accustomed to complete relaxation of accommodation. This would give about one millimetre as the thickness of the fluid. The retinal vessels have the customary dark color and tortuousness which belong to this lesion. At the middle of the fundus the retina becomes of grayish-white color, and at the macula lutea is a round red spot of about half the diameter of the optic disk. When observing the contiguous retina with +10, its texture is clearly seen, and, besides having a slightly-granular look, it is marked by fine streaks or plaits, which radiate from the red spot. Under this inspection the red spot shows no detail, although its edge is sharply defined. But, when the red spot is scrutinized without a glass, it no longer appears as a blur, but exhibits a distinct, reddish, granular look, and it is evident that one is looking at the epithelium of the choroid. At the same time the adjacent retina assumes a blurred appearance, because not in focus; the radiating striæ are not to be seen.

The difference in depth of these two surfaces at once suggested the idea of a laceration of the retina at the macula lutea, and that the red spot was simply a hole through which one could look upon the choroid.

Further and undeniable proof of this explanation of the lesion was found in the phenomena of parallax which were detected by slightly changing one's point of observation. In making such slight movements from side to side, the edge of the opening could be made to conceal and disclose a definite point at the margin of the bottom of the red spot. The edge of the spot was not tremulous, nor was it ragged, nor was there any tissue sloping down from it toward the spot. Critical inspection made it evident that one could look under the retina. I have no explanation to offer of the mechanism of this peculiar rupture of the retina. It is the only instance of this kind which I have ever seen or read of. This much may, however, be suggested, that at the macula the retina is thinner and necessarily weaker than at any other part, and it has a faint amount of coherence with the choroid. The perfect transparency of the vitreous forbids the idea that the retina became detached by adhesion to a shrinking corpus vitreum, and hence we must admit that the effusion was the direct result of the blow. Doubtless this fluid, which now is almost entirely transparent, was at first more or less bloody. It does not at present appear to be perfectly limpid, and Dr. F. Delafield suggested that it might be somewhat gelatinous. The doctor was kind enough to examine the eye, and was able to verify the appearances described, and could suggest no other diagnosis than that this was in truth a hole torn through the middle of the retina. So regular is it in outline, so free from traces of shreds or fringe on the edge, that it might have been cut out with scissors or made with a punch.

In no case of tearing of the retina from bursting of fluid through it have I ever seen any approximation to this shape. The rents have been linear, or curved, or tongue-like. They have usually been near the equator of the globe.

REPORT OF PASSAVANT OPERATIONS WITH AND WITHOUT ETHER, AND ALSO UNDER NITROUS OXIDE. By B. Joy Jeffries, M. D., Boston.

Since my report last year to the Society of the results of thirteen Passavant operations for breaking up posterior synechiæ or attachments of the iris to the capsule, I have successfully employed it in the following cases:

A woman has had chronic irido-choroiditis, and, as sequelæ, some four or five attachments of the iris to the capsule. Around these the pupil dilates, showing the iris-tissue to be still good. There is constant trouble from the eye, aggravated, I judge, by the dragging of these posterior synechiæ. Therefore, under ether, I broke away two that were close together at the upper side. After breaking one, and the aqueous had escaped, I found no great difficulty in pushing the point of my closed forceps between the iris and the cornea, against which it of course laid, to reach the next one close beside it. In a few days I broke another at the opposite side of the pupil, also under ether. The patient was rendered quite sick and uncomfortable by the ether, so much so that I proposed to her trying to break the next without anæsthetic. This she consented to, and I succeeded without difficulty. She did not complain of the pain as being very great, the dragging on the iris seeming to be the most painful part. That it was not severe was certainly proved by her preferring to have the fourth and last operation also done without anæsthetic. With a little care and command over the patient, I had no difficulty in holding the eye sufficiently steady. A compressive bandage was each time left on overnight. The aqueous humor is, however, much sooner resecreted, and corneal wound closed. The patient went back to her occupation in a store, within forty-eight hours after the last operation, the eye now being hardly, if any, troublesome.

Another case was that of a man injured by the premature discharge of a blast. The face and eyes were full of powder. He had had traumatic iritis in the left eye, and atropine showed three broad posterior synechiæ. Both corneæ were so filled with powder, and the eyes in such a bad condition, that I judged it best to remove as many of the grains of powder as possible, and for that purpose kept him under ether some time, since he could not have held the globe still enough to work without. He was miserably sick from the ether, and dreaded taking it again. I therefore very gladly availed myself of the kindness of Dr. Robert Amory in offering to give the patient nitrous-oxide gas. As he has reported on the special method of administering this anæsthetic, I omit speaking of it here, except to say that, after the mouth-piece was removed, I had more than ample time to carry out my operation—time enough to have performed an iridectomy, or even a longer operation. For such short operations, not followed by pain, I regard the nitrous oxide as invaluable. Passavant's operation has to be repeated as many times as there are widely-separated attachments, and, although I persuaded one patient to submit to it seven times under ether, we shall not always be so fortunate. The posterior synechiæ were so broad in this case, and the iris possibly friable, that I did not like to attempt to break them away without an anæsthetic, for fear of the pain. The patient was perfectly satisfied with the gas, experiencing no pain whatever. A compressive bandage was kept on a few hours after each operation. The three operations have resulted in leaving a free movable iris. Spots of pigment, where the attachments were, are seen on the capsule. To what extent they will disappear I will not attempt to say. Judging from previous cases, I think all lymph will be gradually absorbed.

A man, aged sixty, has had granulations, ulcers of the corneæ, etc. The results are, central corneal opacity in the right eye, with anterior synechia, and a single posterior synechia downward in the left eye.

May 23, 1871.—An iridectomy for artificial pupil was done on the right eye, and a Passavant on the left, perfectly freeing the pupillary edge of the iris.

A man, aged twenty-three, has run through with a fearful attack of syphilis, leaving, as sequelæ, total posterior synechia and closed pupil in the left eye, and three or more attachments in the right.

May 6, 1871.—Iridectomy downward for artificial pupil was done on the left eye, and by a Passavant the attachment below broken in the right eye. Atropine now keeps *this clear* of the capsule, although there are still two attachments above.

May 30*th*.—I made two corneal openings with a broad needle opposite the two attachments, and broke them both, one after the other. The flowing off of aqueous did not prevent my sliding the forceps between the cornea and iris without injuring the capsule. The two punctures did not cause the loss of a whole drop of aqueous fluid. This procedure, of course, saved one additional operation.

A man, aged thirty-two, has in the right eye total posterior synechia, lens opaque, iris discolored, globe soft, vision gone—the result, seemingly, of old irido-choroiditis. In the left eye there have lately been slight irido-choroiditis, and a resulting rather broad synechia downward, which was broken May 30, 1871, and the released iris gave a circular pupil. I looked upon this attachment, perhaps of old date, as a readily-exciting cause of fresh inflammation.

In these seven, and the thirteen operations previously reported, I did no harm to the capsule, and certainly improved the condition of the eye. In the second operation in the last case, owing either to the close and broad attachment, or my not grasping the iris deeply and firmly enough, it was a little torn, and a filament dragged into the wound. It, however, entirely replaced itself before the eye was bandaged, and no traces are now seen.

With Dr. Passavant, as with me, this operation has always been successful; I therefore think it proper to quote the following, from the *Medical Times and Gazette* of May 29, 1870, by Dr. Alex. Ogston, of Aberdeen, who, in referring to Dr. Passavant's article, says: "This paper of Dr. Passavant appeared so honestly written that a trial of his method was instituted in the next case that presented itself in the Aberdeen Hospital. In this case, as in all the cases where I have tried it, the operation was followed by no bad results as regards the iris; but, though the adhesion was seen to tear, the contraction of the pupil, which invariably followed on the escape of the aqueous humor, allowed the two ends of the adhesion to lie so close to each other that they united again in spite of the free use of atropine, and by the time the corneal wound was healed the same state of matters existed as before the operation, only the adhesion was not so broad as before."

As Dr. Ogston does not minutely describe his method of operating, I can only imagine his results were due to having made a larger and more peripheric wound in the cornea than was necessary, whereby the aqueous chamber was not quickly enough reëstablished. I found no such trouble as he describes. He now operates in a different, and, as I contend, much more dangerous method, namely, he passes a not too sharp needle into the aqueous chamber opposite the point of iritic attachment, and, engaging the point of the needle in the iris tissue, forces it away to break the synechia, using the hole in the cornea as a fulcrum. The unnecessary danger of wounding the lens, and thereby producing cataract, which we must run in such a procedure, would be sufficient to induce me to hold to Dr. Passavant's method, which I have so far always found successful, and not so very difficult for those accustomed to ophthalmic operations, especially as I am now convinced it can be readily performed under nitrous oxide, a hundred gallons of which anæsthetic may be carried about with perfect safety in a case twenty inches long and eight square, as Dr. Amory has practically demonstrated.

Instead of an iridectomy-knife, I now use a broad paracentesis-needle. I find no difficulty in manipulating my delicate forceps in the corneal wound this makes, and I lose but little aqueous before the iris is grasped, when the escape of the fluid rather assists in the breaking the attachment. Atropine is continued, and the humor secretes so quickly, that there is no time for the iris to again fasten itself to the capsule. I have occasionally succeeded in not losing all of the aqueous humor during the whole operation.

CASE OF READJUSTMENT OF THE LEVATOR MUSCLE OF THE UPPER LID. By John Green, M. D., St. Louis, Mo.

Readjustment of the levator of the upper lid has been but rarely performed, and has still more rarely been followed by restoration of the proper function of the muscle. In fact, the reported cases of this operation have been, for the most part, in paralytic ptosis, where we should, *a priori*, expect least from it. In the following case the ptosis was traumatic, and the indications for operation were substantially the same as in the operation for readjustment of the internal rectus:

—— Williams, five years of age, son of Dr. A. G. Williams, of Dongola, Illinois, was gored over the left eye by a cow, about two years before I saw him. The whole upper lid was torn from its attachments, with the exception of a narrow bridge at the outer end. The wound was dressed by the father, who reunited the severed integument quite accurately by sutures. Complete and accurate union of the skin was obtained, but with considerable irregularity of the conjunctival surface of the lid, and with complete ptosis. The eye was wholly uninjured.

I first saw the boy, in consultation with the father, March 15, 1871. The left upper lid appeared considerably thicker than the right, partially from an overlapping of the tarsal cartilage, which seemed to have been torn across about the middle of its length, and in part from a somewhat excessive quantity of subcutaneous adipose tissue just above the upper border of the cartilage. There was no sign of any action of the levator muscle in any of the movements of the eyes, but the lid hung motionless, except as it was lifted slightly by the contraction of the occipito-frontal muscle drawing upon the skin. There was no impairment of vision, nor any restriction of any of the movements of the eye. The case was evidently one of complete detachment of the tendon of the levator, without other injury of importance. I decided to make an attempt to find the severed tendon, and reunite it to the tarsal cartilage. The operation was performed March 19th, with the important assistance of Dr. T. F. Prewitt.

An incision, of rather more than an inch in length, was made through the skin along the upper border of the lid, and the dissection extended through the subcutaneous fatty tissue in a direction nearly backward, so as to avoid opening the conjunctival sac. The upper surface of the eyeball was thus reached without having encountered any fibres of the orbicularis muscle, or in fact any other tissue than the subcutaneous fat, which was apparently continuous with the fat of the orbit. A broad, thin tendon was seen spread out over the exposed part of the globe, which proved to be the tendon of the superior rectus. Between this and the roof of the orbit the tendon of the levator was easily discovered, and no difficulty was experienced in attaching it, by three sutures, to the front of the tarsal cartilage. The wound was then closed by three other sutures, leaving the ends of the three deep sutures protruding externally.

The subsequent swelling was very moderate, and the external wound healed promptly without suppuration. The superficial sutures were removed on the fourth day, and the deep sutures left to become detached spontaneously. The boy was allowed to go home on the fifth day, the levator muscle evidently performing its function, although impeded in its action by the swelling of the lid.

Two months later the father wrote to me as follows:

"*May* 22, 1871.—The operation was a perfect success; the muscle united by first intention, and the eye opens and shuts simultaneously with the other."

ADDITIONAL NOTE UPON THE USE OF ATROPIA IN THE TREATMENT OF INCIPIENT STRABISMUS. By John Green, M. D., St. Louis, Mo.

In the Transactions of this Society for 1870, I reported three cases of periodic convergent squint, in which the repeated instillation of atropia constituted an essential part of the treatment. The applicability of the method to the incipient stages of strabismus occurring in young children is my excuse for again briefly calling attention to the subject.

The conclusions at which I have arrived, as the result of another year's experience, may be briefly summed up as follows:

1. In even a very young child (in one case a child of three years), with commencing strabismus dependent on hypermetropia, the repeated instillation of atropia, to the point of completely suppressing accommodation, leads to the speedy abandonment of the habit of squinting, and the substitution for it of a kind of scowl, having for its object the exclusion of peripheric rays of light by the partially-closed lids.

2. The artificial amblyopia resulting from the total suspension of accommodation supplies a needed motive for the acceptance of convex glasses, which, in turn, by relaxing accommodation, tend to postpone the return of the deviation as the effect of the mydriatic passes off.

3. By repeating the instillation of atropia as often as signs of returning deviation appear, the habit of squinting may be effectually broken up, and the case at last brought fully under the control of convex glasses. This result is sometimes attained in the course of a month, but, in one case, of three years' standing, even at the end of eight months it was necessary still to resort to the atropia at intervals of from two to three weeks.

4. These results have been attained in three cases of periodic squint of fully three years' standing.

5. In cases of permanent deviation, in which parallelism of the visual axes no longer occurs even in perfect rest of the eyes, the effect of the treatment (whether atropia alone or atropia conjoined with glasses) has been confined to an improvement in the position of the eyes. In such cases, however, we have in the degree of the remaining squint an important index of the actual shortening of the interni, and a guide to the extent of the correction to be sought from tenotomy.

From these statements it will be seen that the success thus far attained by this plan of treatment is limited to the preservation of binocular vision through the wearing of convex glasses. This is, however, an advantage of no small importance, when we consider how rarely we are able to restore perfect binocular vision, after it has been once positively lost in consequence of the complete development of a squint. I am convinced that it is far better to arrest the deviation, and at the same time preserve binocular vision, than to sacrifice binocular vision and trust to a future tenotomy to cure the deformity. The danger of accidental injury from the wearing of glasses by a young child may be reduced to a minimum by making the frames strong, and of a somewhat flexible metal, like silver, and choosing the lenses of extra thickness as a safeguard against breaking.

PARALYSIS OF THE TRIGEMINUS, FOLLOWED BY SLOUGHING OF THE CORNEA. By WM. F. NORRIS, M. D., Philadelphia.

W. McC., aged forty-two, horse-jockey, came to the clinic of the University of Pennsylvania, September 11, 1871, complaining of an inflammation of the left eye. The patient is pale and emaciated, and has a large epitheliomatous growth at the left angle of the mouth, which he says has existed for several months.

The left eye has been sore only one week, and the conjunctiva now presents a bright-red hue, but remains transparent and without granulations. There is slight bulbar chemosis and a punctated keratitis, most marked at the centre of the cornea, which renders it difficult to see the iris except at its periphery. It appears, however, to respond to the stimulus of light, and certainly dilates under atropine.

There is a slight drooping of the eyelid. The eye is mobile in all directions, but has lost its sensibility, and the cornea and conjunctiva may be touched without his evincing any consciousness of it. There is also impaired sensibility both in the skin and mucous membrane of the left side of the nose. The sense of taste seems also impaired, and salt placed on the left side of the tongue is much less promptly recognized than on the right. There is slight paresis of the left facial nerve, and marked deafness on the same side—does not hear a watch on contact, and a tuning-fork held at the vertex is heard only on the right side.

A solution of atropine was instilled into the eye, and a compress bandage applied so as completely to close the lids. This was removed twice daily, to cleanse the eye, and immediately reapplied to prevent the ingress of dust or other foreign bodies. Notwithstanding these precautions, the inflammation of the cornea progressed, and a small slough formed at its centre, and separated. The minute aperture thus caused was blocked up by the iris, and subsequently showed as a central black spot.

September 20th.—He for the first time experienced a sensation of dizziness, and found that he could with difficulty walk straight. This feeling however, soon passed off, and up to date he has driven a pair of horses daily in the park.

October 15th.—He has been absent from the clinic and confined to the house for the last two weeks, owing to the tumor at the angle of the mouth becoming inflamed and ulcerated. During this interval he has had repeated attacks of dizziness, usually occurring in the afternoon, and causing him to stagger in walking. His gait is now habitually unsteady.

The limbus cornea above and below has become vascular, and next to it is a comparatively clear rim of corneal tissue, which is separated by a sharply-cut groove from the opaque central portion.

The right eye is healthy and emmetropic, $V=\frac{20}{XX}$.

October 15th.—The eye is more inflamed, and there is marked hypopyon.

October 20th.—There is less inflammation, and the pus in the anterior chamber has been absorbed.

On this day Dr. Garretson removed the epithelioma at the angle of the mouth, and the patient passed from my observation. Through his kindness I learn that on the 24th and 25th there was violent pain in the head, the patient crying out that "it would kill him." On the 26th the pain was still severe, but was more in the neck and cheek. From this date, although the attacks of pain were much less frequent, and his mind, which had been wandering, became more clear, the patient gradually grew weaker, and on the 21st November died. No autopsy was allowed.

The interest of the above-detailed case centres in the fact that, although the patient was seen at an early stage of the inflammation of the cornea, the most sedulous care in cleansing the eye and protecting it from external irritants, did not prevent the necrosis and perforation of the central portion of the cornea.

Inasmuch as the views of physiologists as to the influence of the trigeminus in the nutrition of the cornea are so diverse, it may be of interest to recapitulate the results of a few of the more prominent experimenters. Herbert Mayo [1] showed that section of the fifth nerve within the cranium produced insensibility of the eye. Charles Bell [2] recognized the fact that the sensibility of the eyeball was due to the fifth nerve, and maintained "that, when that sensibility is destroyed, although the motions of the eyelids remain, they are not made to close the eye, to wash and clear it, and, consequently, inflammation and destruction of that organ follow." Magendie [3] showed that section of the nerve in rabbits produced anæsthesia of the eye and inflammation and sloughing of the cornea. He, and after him, Longet, found that section of the nerve anterior to the ganglion of Gasser was more likely to produce this effect than section posterior to it. The latter [4] attributes the changes which take place in the eye to impaired nutrition, and argues that they cannot be due either to diminished secretion of tears or to the insensibility of the eye, because neither the more complete dryness of the ball, after extirpation of the lachrymal gland, nor the prolonged contact of the air in paralysis of the facial nerve, produces the same effects.

Graefe [5] experimented on rabbits, and found that intracranial section of the trigeminus caused insensibility of the ball, and complete opacity of the cornea, which in his experiments never went on to perforation. He maintained that the trigeminus is in part a trophic nerve, and that the destructive changes ensuing in the eye are not alone due to insensibility to external irritants, because extirpation of the tear-gland and cutting off both eyelids do not produce the same effect—the cornea remaining transparent. He also adduces pathological cases (in man) in which perforation of the cornea occurred.

Snellen [6] cut the trigeminus in rabbits, and found that, when he protected the eye, by sewing the yet sensitive ear over it, the cornea remained intact for ten days, but that without this precaution it rapidly clouded. He has since published a case in a middle-aged man, where the eye improved when placed under a stenopaic shell, and the acuity of vision rose from $\frac{20}{CC}$ to $\frac{20}{XX}$. When the protection was removed it again sank to $\frac{20}{C}$, and immediately improved on its reapplication. He therefore argues that the changes in the cornea are traumatic, and not due to any trophic influence of the ganglion of Gasser.

---

[1] Anatomical and Physiological Commentaries, Lond., 1822, No. II., p. 5.

[2] Nervous System of the Human Body, London, 1830, p. 207.

[3] Journal de Physiologie expérimentale, tome iv., pp. 176–183, 1824.

[4] Anatomie et Physiologie du Système Nerveux, t. ii., p. 161, Paris, 1842.

[5] Archiv. für Ophthalmologie, Band I., Abth. I., S. 306–315.

[6] Virchow's Archiv., 13 Bd., S. 107, 1858.

Meisner[1] holds that the inner fibres of the nerve are more important than the outer for the preservation of the cornea, because, if the nerve be only partially divided and the former left intact, the cornea, although insensible, does not become opaque.

Schiff[2] arrived at much the same conclusions.

Finally, Sinitzin,[3] from experiments on rabbits, advances the following views:

1. That extirpation of the superior cervical ganglion of the sympathetic caused congestion of the choroid, and increased the temperature of the eye.
2. That the cornea in the operated side became more capable of resisting external irritants.
3. That, after cutting the trigeminus in front of the ganglion of Gasser, neuroparalytic affection of the cornea does not ensue, if the superior cervical ganglion of the sympathetic be at the same time extirpated.
4. That, after such changes have set in, they become retrograde, and disappear after extirpation of the ganglion.
5. That this is possible, so long as the cornea has not become dry and horny, and that even at this period it arrests further destruction.
6. That ulcerations of the lips and lids also disappear, and that, to allow repair to take place, it is not at all necessary to protect the eye.

---

[1] Henle and Pfeuffer's Zeitschrift (3), xxix., p. 96 (quoted by Wells).

[2] Ibidem, p. 217 (quoted by Wells).

[3] Centralblatt für Medicinischen Wissenschaften, No. 11, March 18, 1871.

A CASE OF CONGENITAL FISSURE OF THE LIDS. By W. W. SEELY, M. D., Cincinnati.

FREAKS in embryological development are interesting as curiosities, and instructive when studied in connection with the normal growth.

The case I have met with presented abnormalities in both lids, and also in the ball.

Beginning at the outer angle and following the lower lid toward the inner, we found the development perfect for about three-fourths of the length of the normal lid. Then, by a pretty steep angle of declension, the lid terminated with a channel, through which the tears flowed upon the cheek. The remaining fourth of the lid was found as a piece of skin, of an irregular, inverted V-shape, closely attached to the globe, extending to near the sclero-corneal junction.

The upper lid extended, with perfect development, to a point corresponding to the beginning of the defect in the lower. Here there was a slight notch; then the free margin was continued on to the inner angle, but without cilia, or Meibomian glands, so far as I could discover. There were, also, no cilia on the angle of termination in the lower lid, none upon the fold of skin attached to the globe. Nor were there any Meibomian glands in this attached portion, and no cartilage. There was likewise no trace of the inferior canaliculus.

Dr. Wecker has given a description of a case of congenital fissure of the lid (see *Arch. für Ophthal. und Otol.*, vol. i.), and has referred to nine others.

So far as I can discover, the case I have described is peculiar in this, that there was a very large portion of skin attached to the globe. This portion, however, did not fill up the defect when the lids were closed, for a space was still left between the lid proper and the adherent portion. With the exception of this adhering part, the eyeball was perfect.

I have seen one case of slight notching of the upper lid, occurring in a child affected with single harelip. Also a dermoid tumor about the sclero-corneal junction, without any coloboma of the lids.

The child whose case I have described had a suspicion of defect in the upper lip, and also of the alveolar process. The lip seemed to be thinned in front of each nostril, the fact becoming quite apparent when the child cried and the lip was stretched.

According to Kölliker (*see* "Entwickelungs Geschichte des Menschen und der Höheren Thiere"), we have the sclerotic and cornea appearing in the latter part of the second and first part of the third months. The eyelids begin, as small folds of skin, about the first of the third month; come into contact and unite in the fourth.

It would seem, according to the pointing of some of these cases of defects, that, along with the formation of the lids, there must also take place a histological transformation of the skin covering the eyeball, into two layers of mucous membrane; the one, the palpebral, the other, the ocular conjunctiva.

Continuing our reasoning with this view, we are of course forced to regard these colobomata as simply arrests of histological transformation.

As regards the operative interference, I would simply add that the first step was to free the movements of the ball, which of course were very much restricted by the cuticular attachment. To accomplish this, I dissected the attached portion loose, down to a level with the *cul-de-sac*, and snipped it off. Then, by loosening the conjunctiva a little, and making two incisions along the *cul-de-sac*, on either side, it was readily brought together over the denuded spot and held by two sutures.

Two weeks later, I prepared the parts, denuding them up to the inner angle, also the lid, and, by making an incision horizontal to its free margin, carried it forward and fastened it.

It fitted nicely, and remained three days, when the mother brought the child in, saying she had torn the parts loose. Subsequent attempts failed to keep them together.